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FIRST REPORT ON STATUS AND PROGRESS OF NOISE RESEARCH AND CONTROL PROGRAMS IN THE FEDERAL GOVERNMENT. VOLUME 1: REPORT ON STATUS AND PROGRESS

Environmental Protection Agency
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June 1975

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JUNE 1975

VOLUME 1

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Issued in compliance with Section 4(c)(3) of the Noise Control Act of 1972 (PL 92-574), this report describes Federal noise control and research activities and establishes a baseline of agency program information that may be used in subsequent years to assess progress in the Federal Government's noise control efforts. Thirty-nine Federal agencies were requested to submit information on their noise related activities to EPA. Volume I of the report contains a summary and assessment of reported activities which are described both by agency and by the following functional areas: noise standards and regulations, noise abatement, hearing conservation, technical assistance, and research. Volume II consists of four reports describing Federal agency noise research, development, and demonstration programs in the areas of surface vehicle noise, aviation noise, noise effects, and machinery noise. The reports include project descriptions and fiscal data and were prepared jointly by the membership of four interagency research panels, formed in 1974 by EPA.

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PREPARED BY
THE U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF NOISE ABATEMENT AND CONTROL

This document has been approved for general availability. It does not constitute a standard, specification, or regulation.

1a

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SECTION 1

INTRODUCTION

This report has been prepared in compliance with the Noise Control Act of 1972*, which requires that EPA "... publish, from time to time, a report on the status and progress of Federal activities relating to noise research and control. This report shall discuss the noise-control programs of each Federal agency and assess the contributions of those programs to the Federal Government's overall efforts to control noise."** This is the first of such reports.

Although the report provides descriptions of Federal agency noise research and control programs, it contains limited information with respect to the "assessment" referred to in the Act. The Section 5 (a) (2) document, *Informations on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety* (hereafter called the "Levels Document"), was published by EPA in March 1974. This document should facilitate future assessments of the noise-related activities of Federal agencies, including goals and objectives. Future reviews of individual agency programs shall be made in the context of their contributions in progressing toward the protective levels set forth in the "Levels Document." In this current report, assessments that are made are confined to specific activities.

Section 3 of this report describes the progress of EPA planning actions to achieve a comprehensive noise control plan. It provides some tentative long range goals that can be used as the basis for further development of a plan. It also explains the interactions and the mechanisms involved in achieving such a plan via interagency cooperation.

Section 4 provides a compilation of the various Federal activities pursuant to the development and implementation of noise standards and regulations.

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*P.L. 92-574, hereafter referred to also as NCA.
**NCA, Section 4 (c) (3)

Section 5 covers several kinds of noise activities engaged in by Federal agencies:

- Hearing conservation programs, intended to prevent occupational hearing loss in noisy Federal installations.
- Noise abatement programs, which are miscellaneous activities to reduce the noise emissions associated with operations of Federal installations, primarily for reducing noise impacts on surrounding communities.
- Technical assistance programs provided by Federal agencies to state and local levels of government.

Section 6 contains a summary of the research and development activities of Federal agencies. (Nonfederal work such as independently sponsored research programs of private industry are excluded). This represents a large, diverse, and expensive set of Federal activities. Descriptions of the programs within specific agencies and within specific noise problem areas are provided as appendices.

Appendix A contains the guidelines distributed to Federal agencies for obtaining information on noise related activities. The appendix also contains a list of 38 agencies to which the guidelines were sent and a list of agency acronyms used in this report.

Appendix B consists of a questionnaire developed by EPA for surveying in the future hearing conservation programs throughout the Federal Government. (The questionnaire was not used to collect information on hearing conservation programs for this report.)

Appendix C provides summary descriptions of reported Federal regulatory and nonregulatory (hearing conservation, noise abatement, and technical assistance) noise control programs. These descriptions are organized in alphabetical order by agency with the Federal departments treated first. The appendix also contains a summary of international noise research and control activities.

Appendices D, E, F, and G (Volume II) contain descriptions of Federal agency noise research, development, and demonstration programs in the areas of surface vehicles, aviation, noise effects, and machinery , respectively. The information in these appendices was prepared jointly by the membership of four interagency research panels formed by EPA in 1974. That is, these are not EPA-prepared reports but rather consensus reports of the agency representatives on the panels.

SECTION 2

OVERVIEW

This report describes the status and progress of Federal noise research and control programs and reflects the initial EPA assessment of the overall Federal effort to control noise. It is the first of such reports EPA is required to publish from time to time under the Noise Control Act of 1972. Contributions made by individual Federal agencies (including those authorized by other legislation) are summarized by functional areas in the identified major sections of the report, with detailed agency descriptions provided in Appendix C.

EPA NOISE CONTROL PLANNING (Section 3)

Early in 1973, EPA prepared an initial strategy for the noise program that delineated as an interim goal a reduction in equivalent noise levels of 5 dB by 1985 at 18 community sites studied in the Title IV Report of February 1972. This strategy included regulatory actions by EPA and provision of technical assistance in controlling noise to state and local governments through EPA regional offices.

The initial EPA strategy was revised in 1974 to incorporate the new information developed in conjunction with the "Levels Document." This document identified levels of environmental noise in various areas and conditions requisite to protect the public health and welfare with an adequate margin of safety. It also provided a basis for attempting a uniform overall assessment of the national impact of noise and the relative contributions from various product types to that impact.

In the "Levels Document," EPA identified a level of $L_{eq(24)}$ = 70 dB (an energy equivalent of 70 dBA over a 24 hour period) to protect against hearing loss with an adequate margin of safety. An estimated 13 million people presently reside in areas in which the $L_{eq(24)}$ exceeds this level. Further, an estimated 100 million people reside in areas in which the L_{dn} (A-weighted day-night sound level) exceeds 55 dB, the identified level with an adequate margin of safety at which undue interference with activity and annoyance will not occur. Major factors in this blend of community noise are such sources as vehicular traffic, aircraft operations, and construction site machinery.

EPA program plan for FY76 allocates resources for regulatory development and related activities to achieve, by 1992, a reduction from 13 million to less than 1 million in the population exposed to urban noise levels above 70 dB $L_{eq\,(24)}$ and a reduction from 100 million to less than 40 million in the population exposed to urban noise levels above 55 dB L_{dn}.

The present strategy calls for both the application of present technology and the utilization of results of current research. New product regulations which will cause new technology to be applied, are to be completed by 1982. The estimated turnover time fc the majority of the nation's truck population is approximately 10 years, and trucks are the single most important source of urban noise. Therefore, the year 1992 was selected as the target year for achieving the above stated goals. Attainment of these goals will necessitate complementary activity by the Federal Aviation Administration to reduce aircraft noise, as well as state and local regulatory and enforcement action requiring Federal technical assistance and focusing on in-use controls for products and land-use planning and control. For the entire program to be fully effective, the in-use product controls must complement the Federal standards for new products. EPA is currently assessing the needs of state and local governments for Federal technical assistance.

To measure progress in achieving these long-term goals as a result of Federal regulatory actions and state and local efforts, EPA strategy calls for a noise trend monitoring program. As presently envisioned, the program will incorporate periodic nationwide site surveys, coupled with selected monitoring evaluations and the application of prediction modeling techniques.

A variety of procedures and organizational arrangements are used to discharge the EPA legislative mandate to coordinate Federal agency noise control programs and actions. EPA chairs four interagency noise research panels established in 1974 to facilitate exchange of information and to coordinate Federal noise research activities.

The Environmental Impact Statement review process is used to ensure that noise and its environmental effects are given adequate consideration in Federally sponsored activities. Executive Order 11752 requires Federal facilities to comply with Federal, state, interstate, and local noise regulations. EPA is charged with monitoring Federal agency observance of E. O. 11752, which, therefore, as a byproduct, provides a vehicle for the coordination of Federal noise abatement projects designed to reduce noise impact from Federal facilities. Finally, EPA has taken the initiative of establishing specific collaborative arrangements between agencies. Some of these are informal, but others are designed as formal Memoranda of Understanding (with the Consumer Product Safety Commission (CPSC), the Department of Transportation (DOT) (both still to be executed)) or Interagency Agreements (for example with the Department of the Air Force, and the National Bureau of Standards).

REGULATORY ACTIONS (Section 4)

At this time all basic or initial actions called for by NCA provisions (such as NCA Section 5: Identification of Major Noise Sources; Noise Criteria and Control Technology) have been initiated. All NCA mandates for rule making have received attention through implementing actions. Some of these actions have reached the stage of proposed and final rule-making by EPA; some–for aircraft noise and noise control in the work place–have resulted in the publication by EPA of regulatory proposals. In other actions, products being considered for possible regulations have been taken under active study.

EPA interactions with the Federal Aviation Administration (FAA) concerning aircraft-noise control have reached a significant stage. Several proposed regulations have been submitted by EPA to the FAA, and the procedures for their consideration and promulgation, as specified by NCA Section 7, are being implemented by the FAA. The balance of regulatory actions to be proposed to the FAA, which were summarized in the EPA *Report to Congress on Aircraft/Airport Noise* of July 1973, are expected to be completed during FY76.

Implementing actions for NCA provisions for enforcement of noise control regulations are being prepared by EPA and initiated through appropriate arrangements in other agencies to which enforcement tasks have been assigned. This includes the areas of import regulations and preparatory work with the Department of the Treasury and the U.S. Customs Service.

NCA Section 15 authorizes the Federal Government to allow economic incentives for the procurement of low-noise-emission products. This authorization applies only to new products for which standards have been promulgated under NCA Section 6. Implementation of the incentive provision must therefore be deferred until the Section 6 standards become effective. The procedures to implement Section 15 have been published by EPA in the *Federal Register* in February 1974.

Presently, the Federal regulatory programs address the control of noise in the following areas (See Section 4 and Appendix C for more detail):

1. *Aircraft and their operations*
   - FAA advisory circulars and regulations provide for noise abatement through flight procedures (consistent with safety) at takeoff, and during approach and

landing, and through specifications of minimum altitudes, and provide for prevention or control of sonic boom. Aircraft type certification provisions are being modified by FAA to include noise attenuating equipment through retrofit of current aircraft and through new designs for categories of future aircraft.

- For practically all of these regulatory areas, EPA is issuing regulatory proposals to FAA. For airport noise control, a proposed set of regulations is currently being field tested by EPA prior to issuance of formal notice for review.

2. *Surface transportation*

- DOT/FHWA has issued noise design standards for new and improved Federal-aid highway construction and has proposed extension of such standards to existing highways.
- EPA issued a noise emission standard for interstate motor carriers in October 1974 which will be enforced by DOT, as called for in the NCA. A noise emission standard for interstate rail carriers has been proposed by EPA.

3. *Commercial products*

- Two proposed rule-making notices were issued by EPA in October 1974 for new products identified as major noise sources: portable air compressors and medium and heavy duty trucks.
- In November 1974, EPA proposed an Advanced Notice of Proposed Rule-Making relating to hearing protectors that would provide for labels with information on the effectiveness of the protectors in attenuating noise and in protecting hearing.
- EPA has begun collaboration with the Consumer Product Safety Commission. Initial action involved the Commission effort to include noise limits in the proposed safety standard for power lawn mowers. That collaboration is now being formalized and widened to address other products.

4. *Housing*

- The Department of Housing and Urban Development (HUD) specifies noise control standards and techniques for HUD-assisted new housing construction.

5. *Noise exposure in the work place*

- The Occupational Safety and Health Administration (OSHA) in the Department of Labor (DOL) has, with the assistance and counsel of the National Institute for Occupational Safety and Health of the Department of Health, Education, and Welfare (HEW), sought to improve and advance the protective standard for noise control in the work place. Originally provided under the Walsh-Healy Public Contracts Act, the standard now administered by OSHA specifies a 90 dBA, 8-hour exposure limit with a 5 dB time/intensity trading ratio for steady-state noise. OSHA has published a proposed revision to the standard, which requires initiation of a hearing conservation program beginning at 85 dBA but still retains the original exposure limit.
- EPA did not consider the original standard sufficiently protective and had advocated that an 85 dBA, 8-hour exposure limit with a 3 dB time/intensity

trading ratio be formally adopted (to become effective within three years) instead of the 90 dBA limit and 5 dB ratio required by OSHA. EPA used the procedures of Section 4 (c) (2) of the Noise Control Act to request a formal review.

- The current OSHA standard was originally adopted by the Department of the Interior for coal mines in 1970 and 1971, and, more recently, by DOT for the Vehicle Interior Noise Standard for interstate motor carriers, in October 1974. EPA has advocated that DOT reexamine this standard, in view of EPA recommendations on the proposed revision to the OSHA standard.
- By *Federal Register* notice in August 1974, EPA consented to application of the extant OSHA standard to metal and non-metallic mines on the condition that a more stringent standard be submitted by the Department of the Interior, through the Federal Metal and Non-Metallic Mine Safety Advisory Committee, for prompt consideration and approval.

NONREGULATORY NOISE CONTROL PROGRAMS (Section 5)

The nonregulatory noise control programs of Federal agencies are divided into

- Hearing conservation programs,
- Noise abatement programs, and
- Technical assistance to state and local governments.

The hearing conservation programs are designed to prevent loss of hearing among personnel whose occupational duties expose them to potentially hazardous levels of noise.

In July 1974, EPA requested 38 Federal agencies to submit a headquarters level perspective of their noise exposure problems and of hearing conservation efforts instituted to correct them. Of those 38 agencies, 24 reported hearing conservation activities. Among those 24 agencies or their reporting components, 19 had initiated limited preventive measures and 27 components had instituted formal hearing conservation measures. The programs differed widely in scope and composition. Several agencies—the three military departments, the Department of the Interior (DOI), the Tennessee Valley Authority, and others—conduct fully operational programs that incorporate innovative techniques; sixteen agencies and organizational components reported more stringent noise exposure standards or program applications than the DOL requirements.

EPA conducted a pilot study to develop and field-test a questionnaire that may be used in the future as a general survey instrument to evaluate the effectiveness of Federal hearing conservation programs. The study included visits to 12 Federal installations in order to observe at first hand the actual operation of their hearing conservation programs. As a byproduct of the study, certain patterns and practices common to the 12 installations were observed. Although based on a limited sample, these observations may suggest areas for further inquiry.

Federal noise abatement activities include measures to control noise generated by Federal agency facilities and operations, primarily for the purpose of reducing noise impacts on the surrounding communities. Further measures seek to reduce nonhazardous noise levels to improve the working environments in Federal installations. Other efforts utilize noise control techniques that are not only applicable to a particular agency's operations but to activities falling under that agency's jurisdiction.

In the EPA survey, 17 agencies reported that they were conducting noise abatement programs. The program activities differ widely, primarily due to varying noise problems, and range from engineering measures to correct a specific noise problem to the Department of Defense (DOD) program for Air Installation Compatible Use Zones (AICUZ). This latter program is designed to ensure that the use of privately owned land near military airports is compatible with both protection of the public and mission accomplishment. The magnitude of this program is indicated by the fact that 75 percent of the total Navy noise abatement funding for FY73 through Post-FY77 ($445,626,000 of a total requirement of $587,885,000) is for Navy AICUZ implementation.

Thirteen of the 17 agencies reporting programs submitted fiscal data for all or part of their noise abatement activities. FY74 funding totaled over $10,000,000 for the 13 agencies and FY75 funding approached $12,000,000. Several agencies did not submit fiscal data on reported programs (e.g., Air Force implementation of the AICUZ program). Since some of these latter noise abatement programs may also be important in volume and command significant funding, the overall totals may be considered as lower bounds of Federal funding for noise abatement.

Six Federal agencies and organizational components reported technical assistance programs to encourage the development of appropriate state and local noise control programs to complement those at the Federal level and facilitate state and local participation in the implementation of Federal noise regulations and programs. Technical assistance is furnished for the drafting of model legislation, for training programs, for guidance in the selection and use of noise measuring and monitoring systems, and for information services.

RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAMS (Section 6)

The Noise Control Act of 1972 makes it clear that EPA is to utilize through interagency coordination the research and technology generated by other Federal agencies to fulfill the provisions of the Act. In addition, EPA is required by Section 4 (c) (1) to coordinate all Federal programs relating to noise research and noise control. Accordingly, EPA developed and implemented a plan in early 1974 to coordinate the Federally sponsored noise research, development, and demonstration (RD&D). The plan utilizes three interacting bodies to effect interagency coordination:

1. An interagency noise research committee composed of high-level representatives of agencies with major programs in noise RD&D.
2. Four interagency noise research panels for aircraft, surface vehicles, stationary machinery, and noise effects.
3. Ad-hoc working groups to address specific problem areas.

The initial task of the interagency noise research panels was to generate reports on the Federal noise RD&D programs and activities. This information was requested by EPA and will provide data for assessing the contributions of these programs to the Federal government's overall efforts to control noise. It will also provide information for identifying gaps in current programs that need to be addressed to successfully implement the Act. In addition, the information will be used by EPA to report, from time to time, on the status and progress of the Federal activities relating to noise research and noise control. The panel reports are contained in Appendices D, E, F, and G. Summaries are provided in the following overview and in Section 6 of this report.

Eleven Federal agencies or departments sponsor noise RD&D: NASA, DOT, HEW, DOD, NSF, DOI, DOC/NBS, USDA, CPSC, HUD, and EPA. Their noise RD&D activities can be classified into four areas corresponding to the four interagency panels:

1. Noise effects
2. Aircraft noise
3. Surface vehicle noise
4. Stationary machinery noise.

Table 2-1 summarizes the RD&D currently being addressed by each Federal agency. Most of the agencies sponsor research in more than one category. However, only DOD and EPA have activities in all four noise RD&D areas. Noise effects research is being sponsored by nine Federal agencies and is the category having the greatest number of Federal participants. Stationary machinery noise RD&D is being considered by eight Federal agencies. Aircraft noise RD&D is currently being sponsored by NASA, DOT, DOD, and EPA, while DOT, DOD, EPA, NSF, and USDA all support surface vehicle noise RD&D.

The total resources allocated to noise RD&D by the Federal agencies are summarized in Table 2-2 for FY73, FY74 and FY75. NASA, DOT, and DOD allocated the major portion of the Federal resources for noise RD&D, but their allocations have steadily

TABLE 2-1

SUMMARY OF FEDERAL AGENCY CURRENT INVOLVEMENT IN NOISE RESEARCH

		Area of Involvement		
Agency	*Noise Effects*	*Aircraft*	*Surface Vehicles*	*Stationary Machinery*
NASA	X	X		
DOT	X	X	X	
HEW	X			X
DOD	X	X	X	X
NSF	X		X	X
DOI	X			X
DOC/NBS	X			X
USDA			X	X
CPSC				X
HUD	X			
EPA	X	X	X	X

TABLE 2-2

SUMMARY OF FEDERAL AGENCY EXPENDITURES FOR NOISE RESEARCH

	Fiscal Year Funding ($1000)		
Agency	*1973*	*1974*	*1975*
NASA	46,407	47,232	28,504
DOT	13,767	5,269	3,467
HEW	1,090	1,613	2,015
DOD	3,897	4,621	3,063
NSF	263	658	–
DOI	409	551	730
DOC/NBS	236	381	407
USDA	4	93	131
CPSC	–	70	–
HUD	117	638	460
EPA	453	1,189	490
TOTALS	66,643	62,315	39,186

decreased since FY73. The result is that total Federal resources for noise RD&D have steadily decreased since FY73, with the major decrease from FY74 to FY75. The latter is primarily due to the decrease in the NASA noise RD&D allocations. HEW, DOI, DOC/NBS, and USDA show steady increases in resource allocations for noise RD&D during the FY73 through FY75 time period.

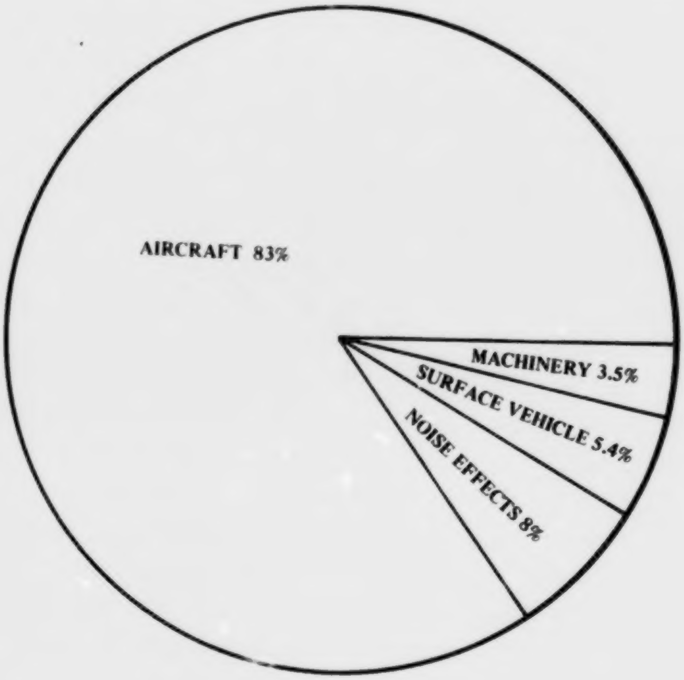
Of the noise research categories shown in Figure 2-1 only Federal expenditures for noise effects research steadily increased during the FY73 to FY75 time period. Federal allocations for RD&D to control aircraft noise decreased rapidly from $58,894,000 in FY73 to $31,054,000 in FY75 and are related directly to the decrease in aircraft noise control RD&D sponsored by NASA, DOT, and DOD. The major element in this reduction is the scheduled completion during this period of two expensive technology development and demonstration programs for retrofit to existing aircraft—the FAA Sound Absorbent Material (SAM) nacelle program and the NASA JT8D REFAN program. However, Federal allocations for aircraft noise control RD&D still account for 80 to 90 percent of the total Federal noise RD&D allocations during the FY73 to FY75 time period. Federal resources for both surface vehicle and stationary machinery noise RD&D peak in FY74. Although a number of Federal agencies sponsor work in these categories, they receive the least emphasis based on resource allocations.

Total Federal noise RD&D expenditures have been steadily declining since passage of the Act. This trend in the Federal noise RD&D funding is illustrated in Figure 2-2. To some extent, the decrease reflects the technology to affect *near-term* reductions in noise has been demonstrated in some cases (e.g., aircraft and trucks) and is available for incorporation into standards and regulations. However, if public health and welfare are to be assured, an adequate Federal noise RD&D effort must be maintained.

EPA is presently analyzing and assessing the available information (principally that contained in the Interagency Panel Reports) on the Federal Noise Research activities to determine the contributions of those RD&D activities in controlling harmful noise through regulations and in identifying gaps and areas requiring additional emphasis. A report detailing the EPA findings of this evaluation is in preparation. A general conclusion from the analysis to date is that the contribution of the Federal noise RD&D programs in providing control technology to support EPA regulatory activities varies between noise source categories. Specifically:

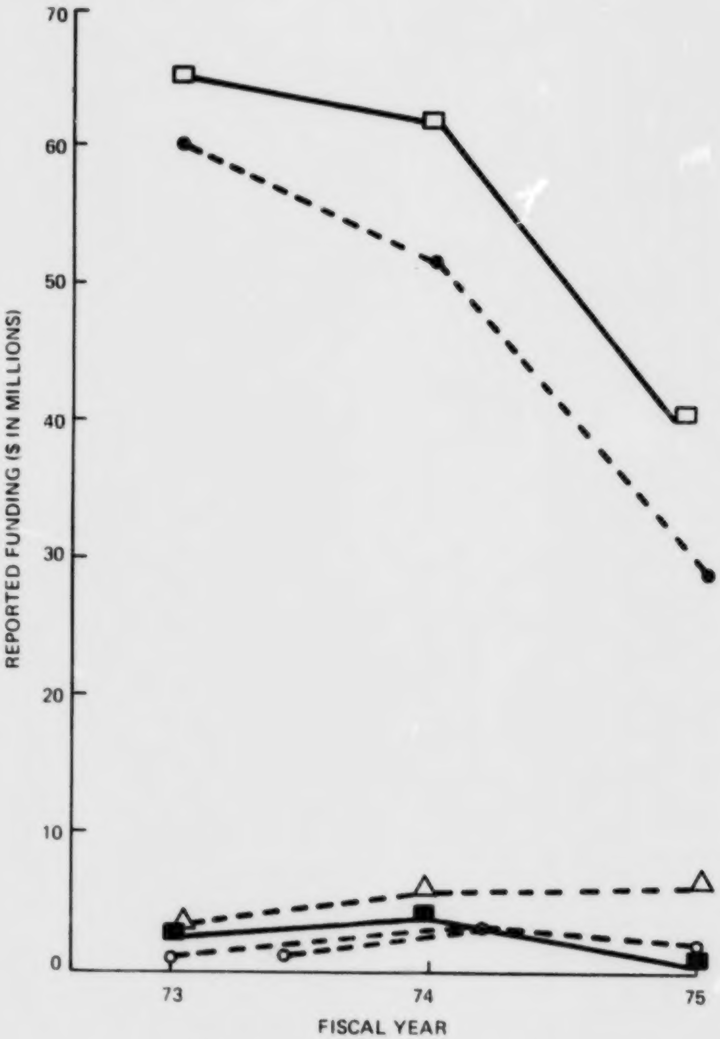
- There is a large amount of Federal noise RD&D on transportation systems, particularly aircraft, trucks, buses, and future mass transit. While the current level of

Category	Fiscal Year Funding ($1000)		
	1973	*1974*	*1975*
Noise Effects	3,566	5,006	5,228
Aircraft	58,894	51,751	31,054
Surface Vehicle	3,211	3,374	1,334
Machinery	972	2,184	1,570
TOTALS	66,643	62,315	39,186



TOTAL REPORTED FY74 EXPENDITURES – $62,336,000

Figure 2-1. Summary of Federal Expenditures for Noise Research Categories



SUMMARY OF FEDERAL EXPENDITURES
FOR NOISE RESEARCH CATEGORIES

	FISCAL YEAR FUNDING ($1,000)		
	1973	1974	1975
AIRCRAFT	58,894	51,751	31,054
NOISE EFFECTS	3,566	5,006	5,228
MACHINERY	972	2,184	1,570
SURFACE VEHICLE	3,211	3,374	1,334
TOTAL	66,643	62,315	39,186

Figure 2-2. Trends in Federal Expenditures for Noise Research Categories–FY73–FY75

RD&D effort in this area appears to be adequate, a complete and in-depth analysis of these programs has not been possible.

- The current Federal RD&D activities on nontransportation noise sources, particularly stationary industrial and construction machinery appear to be inadequate and fragmented. They address only a few of the hundreds of serious noise sources to which workers and the general public are exposed. There is a need for a concerted Federal noise control RD&D effort for these sources, which are most associated with the principal noise health effect, noise-induced hearing loss.

- Many of the known effects of noise are being addressed by current Federal research. However, several critical areas are receiving inadequate attention. These include nonauditory health effects and community response.
- While there is a great deal of emphasis on noise measurement and measurement methodologies, the current efforts are fragmented and will require effective coordination to provide adequate support for EPA regulatory activities.

In general the EPA analysis reveals that the available noise control technology and techniques and the current Federal RD&D efforts appear to be adequate for the initial regulations being proposed and considered by EPA.

In the future, the Federal agencies involved in noise research will be requested by EPA to perform, through the present interagency coordination mechanism, an assessment of the overall Federal RD&D effort. This assessment is expected to yield specific recommendations on current and future noise RD&D objectives and funding requirements and a national RD&D plan to guide the overall Federal noise RD&D effort. Principal areas of activity will be in performing an in-depth analysis of all Federal noise RD&D activities, determining requirements for future noise reduction technology, and conducting evaluations of associated socioeconomic impacts.

SECTION 3

OVERALL EPA NOISE CONTROL PLANNING & FEDERAL INTERAGENCY RELATIONSHIPS

OVERALL CONCEPTS OF FEDERAL NOISE CONTROL ACTIVITY

The Noise Control Act of 1972 recognized that many other Federal agencies had and would continue to have major roles and statutory functions. The coordinating responsibility assigned to EPA in Section 4 of the Act was designed to ensure that actions of the various agencies would be integrated into a comprehensive effort.

This Section begins with a brief discussion of the actions taken by EPA to develop its plans for implementation of the Noise Control Act. This is followed by a more detailed treatment of the interrelationships of the various Federal agency activities (which are categorized and summarized in the subsequent major Sections of the report with detailed agency descriptions provided in the appendices.)

EPA Planning Actions

Strategic planning for the noise program has evolved from an initial strategy for implementation of the Noise Control Act to the present strategy developed for the Agency FY76 program plan. During 1971 and 1972 the EPA Office of Noise Abatement and Control conducted an extensive study of the requirements for full-scale implementation of the then pending Noise Control Act of 1972. This included resource estimates and set the stage for carrying forward a continuing Federal-EPA noise control effort. Early in 1973, a formalized strategy was developed as part of the Agency FY74 program development activity. This strategy delineated as a "surrogate" for a more definite goal, an interim goal of a reduction in equivalent noise levels, e.g. of 5 dB by 1985 at the 18 community sites studied in the Title IV Report, *Report to the President and Congress on Noise*, February 1972.

The 1973 strategy also identified programmatic objectives and prescribed a noise control system approach. Under the approach, aviation noise control and interstate motor carrier noise control regulatory actions by Headquarters EPA were emphasized. This approach also prescribed a phase-in of regulatory action on surface transportation noise sources from the interstate motor carrier regulations as well as a phased sequence of additional new product noise control regulations after FY75. Although the 1973 strategic plan emphasized regulatory actions by Headquarters EPA, the plan also prescribed allocations of limited funds to provide a minimal capability in the EPA Regional Offices to establish a base for regional operations for technical assistance to state and local governments, trend monitoring, and noise regulation enforcement. The 1973 plan provided the flexibility to expand to meet program requirements, presented an approach to Federal-state partnership efforts, and described a potential for reducing environmental noise levels by Federal action. This plan provided the base for FY74 accomplishments and the Agency FY75 noise program budget. A summary of the resources committed by EPA to implementation of the Noise Control Act from FY72 to date is provided in Table 3-1.

In 1974, the 1973 strategy was updated for the FY75 noise program plan to incorporate the new information provided by the "Levels Document." This document identifies the levels of environmental noise in various areas and conditions requisite to protect the public health and welfare with an adequate margin of safety. EPA believes that the levels identified in this document are based on data representing the best available evidence on the effects of noise. The "Levels Document" was exhaustively reviewed by other Federal agencies and the scientific community, and the specified levels and the methodology used to identify them have been endorsed by a subcommittee of the Committee on Hearing, Bioacoustics and Biomechanics (CHABA) of the National Academy of Sciences–National Research Council.

In identifying the levels of environmental noise requisite to protect the public health and welfare, EPA selected a methodology that incorporates two primary measures of acoustic energy appropriate for quantifying long term cumulative noise exposure that can be related to human response. This methodology for expressing environmental noise is described as L_{eq}/L_{dn}. The L_{eq} stands for equivalent A-weighted sound level over a given interval. Thus, $L_{eq\,(8)}$ represents such a level over an 8-hour period. L_{dn} represents day-night sound level–the 24-hour, A-weighted equivalent sound level with a 10-decibel penalty applied to nighttime levels. Using this methodology, EPA identified noise levels that would protect virtually the entire population against a hearing loss of 5 dB or more at the most sensitive frequency (4000Hz) for a 40-year exposure. Also, day-night sound levels were identified that minimize community annoyance from outdoor noise over a long range period of time. Similarly, day-night sound levels were identified that protect against speech interference indoors. These levels are shown in Table 3-2.

TABLE 3-1

EPA NOISE PROGRAM RESOURCES

FY 1972 – FY 1975

		(thousands of dollars)		
ACTIVITY	*FY 72*	*FY 73*	*FY 74*	*FY 75*
NOISE STANDARD SETTING:				
Includes: Aircraft-Airport Regulations; Surface Transportation; New Product Standards; Labeling	752.7	2332.0	2268.3	3467.6
TECHNICAL ASSISTANCE & OPERATIONS (HQ)	70.0	851.1	955.8	955.8
Technical Assistance Federal Activities				
ONAC PROGRAM MANAGEMENT	59.0	26.4	214.6	220.6
RESEARCH & DEVELOPMENT	366.0	280.8	498.4	544.9
ENFORCEMENT	–	–	20.6	21.3
REGIONAL ACTIVITIES	–	–	267.2	465.6
AGENCY & REGIONAL MANAGEMENT/NOISE	–	–	6.0	39.9
TOTAL	1247.7	3490.3	4230.9	5715.7

TABLE 3-2

SUMMARY OF NOISE LEVELS IDENTIFIED AS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

Human Response	L_{eq}	L_{dn}
Hearing Loss* (8 hours per day)**	75	–
Hearing loss* (24 hours per day)	70	–
Outdoor Annoyance	–	55
Indoor Annoyance, speech loss	–	45

*Based on exposure over 40 years.

**As long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24 hour average.

As emphasized in the "Levels Document," these specified levels of environmental noise are based solely on considerations protective of public health and welfare. The levels do not take into account either cost or technology, and, thus, do not in any way constitute a standard, regulation, or specification. However, the information contained in the document provides the scientific basis for the conduct of EPA noise activities and a means by which the health and welfare implications of other Federal agency actions may be assessed. The "Levels Document" was the necessary precursor for initiation of the EPA noise regulatory development process, and it plays a key role in fulfillment of EPA responsibilities to coordinate all Federal noise research and control programs.

A level of 70 dBA $L_{eq\,(24)}$ is identified (Table 3-2) to protect against hearing loss with an adequate margin of safety. This level is related to the cumulative noise exposure experienced by an individual irrespective of location and exposure situation (e.g. in the work place, in the home, during travel, and in various recreational and hobby/maintenance pursuits). It is estimated that about 13 million people presently reside in areas where $L_{eq\,(24)}$ exceeds 70 dBA. Furthermore, passengers in, and operators of, most common modes of transportation are exposed to noise substantially above 70 dBA, as is a substantial portion of the working population.

Approximately 100 million people reside in areas where the L_{dn} exceeds 55 dBA, the identified level with an adequate margin of safety at which undue interference with activity and annoyance will not occur. While this level of community noise results from a blending of all types of sources, noise from vehicular traffic, aircraft operations, and construction sites are major factors in the sustained levels.

The following presently conceived noise program goals are reflected in the Agency FY76 program plan; they represent the basis for EPA regulatory and other program activity resource allocations.

- Reduce the urban noise levels above 70 dBA $L_{eq(24)}$ so that less than 1 million of the estimated 13 million population residing in such areas remain exposed to such high community levels by 1992.
- Reduce urban noise levels above 55 dBA L_{dn} so that less than 40 million of the estimated 100 million population residing in such areas remain exposed to such community levels by 1992.

The general strategy for achieving these goals calls for the application of available technology or technology anticipated from on-going research. New product regulations, which will cause new technology to be applied, are to be completed by 1982. Since truck noise is the single most important source of urban noise, and an approximate 10-year turnover time is a relevant estimate for the nation's truck fleet, the year 1992 was selected as the target date to achieve the above stated goals. The attainment of these goals also requires complementary state and local regulatory and enforcement action allowed by the Federal legislation. This requires appropriate Federal EPA technical assistance (and that of other appropriate agencies), primarily through Regional programs, with focus on product in-use control and land use planning and control.

Also required is the adoption by local governments of in-use regulations prescribing the same noise levels as Federal regulations and protecting against unlawful tampering and modification in accordance with restrictions placed on the user of a Federally regulated noise product. Local governments are encouraged to enact other operational controls such as land use restrictions, zoning, licensing, and permits to effect noise reduction in selected locations during sensitive time periods. In view of the essential role of state and local governments, EPA is studying their needs.

EPA is in the process of refining predictions relative to changes in environmental noise that can be expected as a result of Federal regulatory actions, coordination of Federal programs, and the partnership with states and localities. These predictions, along with periodic nationwide site surveys such as the 100-site survey conducted in 1973, will provide information to measure actual progress against planned objectives and goals.

The FY76 strategy also:

- Calls for complementary regulatory action by the FAA in reducing aircraft and airport noise.
- Calls for a reduction in surface transportation interior noise either by direct regulation or by Federal impact on equipment standards through support of mass transit programs.

- Envisions active, cooperative working relationships with DOT, FAA, Consumer Product Safety Commission, and OSHA in addition to state and local agencies in carrying out abatement and control and enforcement programs.
- Prescribes full use of research and development programs conducted by the above agencies and DOD, NASA and the private sector.
- Provides for continuation of the EPA coordinating function with respect to Federal noise control, research and development, and regulatory actions.

Work is continuing on the development of a comprehensive long range EPA plan and strategy for future programs that meshes strategies for various EPA regulatory actions with technical assistance, research and development, and enforcement strategies. The plan also provides a framework for Federal noise program plans under the partnership approach with states and localities. It also recognizes the Federal interagency roles and the requirement for coordinated action, as discussed in the following paragraphs.

AREAS OF FEDERAL AGENCY INTERACTION

The following discussion delineates specific areas of Federal agency interaction that have been identified as requiring sustained coordination. This is followed by a discussion of the mechanisms used to assure consistency and integration of Federal noise control activities.

Areas Requiring Federal Agency Interaction

In carrying out its coordination responsibilities, particularly in consulting with other agencies involved in prescribing standards or regulations, EPA has identified both existing and potential areas requiring positive Federal agency interaction. Information available to EPA headquarters in this matter has been supplemented by reports prepared by EPA regional offices on implementation of regional Federal agency noise policies and programs.

Jurisdictional Issues

Coordination is required

- When one agency's jurisdiction overlaps with that of another.
- If one agency's enabling legislation specifically assigns another a functional implementation responsibility (i.e., a division of regulatory responsibility).
- In less clearcut instances, in which several agencies, in furtherance of their legislative mandates, have instituted programs that incorporate interrelated features.

For example, in the first category, EPA authority under Section 6 of the Noise Control Act to promulgate noise emission standards for new products overlaps in some instances with Consumer Product Safety Commission authority to develop standards to reduce unreasonable risks of injury associated with the use of consumer products. In the second category is the Department of Transportation responsibility for the enforcement of the EPA-developed noise emission regulation for interstate rail and motor carriers.

Several examples will illustrate the third category. The Department of Housing and Urban Development reported that its policy of fostering noise responsive land utilization patterns necessitates coordination of policies with agencies having influence over the location of noise generators. The Federal Highway Administration, for example, has noise standards that restrict the location of Federally aided highways. Restrictions apply principally to exposures over existing developments, and this ensures that the acoustical quality of HUD sponsored developments will not be undermined by adverse highway locations. In cases in which the nature of future development has not been firmly established, Federal Highway Administration noise policy is directed toward sound land use planning and land use controls, which is itself an important focus of HUD policy. Community land use planning and control is also an integral part of the Air Installation Compatible Use Zone (AICUZ) policy adopted by DOD. HUD is therefore attempting to accommodate this policy in anticipated revisions of Circular 1390.2 and to ensure that planning guidelines issued by HUD and DOD (including the armed services) are consistent and mutually supportive.

Of equal importance to the identification of areas of agency jurisdiction overlap, is a delineation of deficiencies and gaps in statutory authorities as these relate to Federal noise control efforts. For example, EPA Region IV pointed out that reduction of complaints regarding railroad noise may be complicated by the fact that individual railroads rather than the Federal Railway Administration own rights-of-way adjacent to railroad lines.

Implementation of Noise Regulation or Programs

In this area, coordination is required

- To prevent two or more agencies from implementing noise standards or guidelines that directly conflict.
- To capitalize on opportunities for furthering Federal noise control efforts.
- To permit successful implementation of noise control when such activities by one agency are dependent upon the cooperation of another.

In the first category, the Federal Government attempt to incorporate noise abatement planning into Federal housing has resulted in differing requirements by HUD and the Veterans Administration. HUD requires the filing of environmental impact statements by applicants for HUD assistance and may withhold financial assistance if the housing sites are exposed to unacceptable noise. To date, VA mortgage loans have been available without detailed environmental studies, so the possibility exists for developers to seek VA loans instead of HUD financing if noise problems are severe.

Capital grants under the Urban Mass Transportation Act of 1964 offer a good example of an unexploited opportunity for furthering Federal noise control objectives. Although noise must be addressed in general terms to obtain a capital grant under the Act, no noise emission standards for mass transportation vehicles are stipulated. Important strides have been made in developing and applying low noise technology for progressively quieter systems, e.g. BART, METRO.* Finally, interagency dependency is evident between the Forest Service (Department of Agriculture) and the U.S. Military since a large number of military reservations are located in national forests.

Mechanisms to Achieve Consistency and Integration of Federal Efforts

While various mechanisms are available to EPA to facilitate coordination of Federal efforts, the effectiveness of these mechanisms would be enhanced through the adoption of a uniform Federal approach to controlling environmental noise. Such a uniform approach might incorporate both a common methodology for describing environmental noise and the identification of public health and welfare requirements to serve as the basis for assessing Federal noise related activities. The EPA view is that this need has been satisfied by the publication of the "Levels Document," which plays a significant role in EPA reviews of other agency noise regulations, in sponsorship of the use of common systems, and in evaluation of Environmental Impact Statements in which noise is a factor.

The levels of environmental noise that are to be embodied in any Federal regulatory action will, of course, vary according to the statutory mandate under which the regulation is proposed and promulgated and according to various requirements of cost and technology. However, as a matter of coordinating and reviewing all Federal noise research and control programs as required by the Noise Control Act, EPA believes it is essential that such Federal programs use the same environmental noise descriptor.** The Administrator of

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*In June 1974, EPA published a report on *NOISE IN RAIL TRANSIT CARS: INCREMENTAL COSTS OF QUIETER CARS.*

**In the "Levels Document," EPA compared the L_{eq}/L_{dn} methodology to other measures used by Federal agencies (e.g., Composite Noise Rating (CNR), Noise Exposure Forecast (NEF), and Community Noise Equivalent Level (CNEL) for airport noise as well as the HUD Guideline Interim Standards and the Federal Highway Administration Standards) and illustrated the translation of these measures to L_{eq}/L_{dn}.

EPA has recommended that all Federal agencies take immediate action to use the L_{eq}/L_{dn} environmental noise descriptor.

There are four existing mechanisms employed by EPA for interagency coordination:

1. Interagency research panels
2. Environmental Impact Statement Review Process
3. Executive Order 11752
4. Assistance between and among Federal agencies.

Interagency Noise Research Panels

In 1974, four interagency noise research panels were formed to facilitate coordination among Federal agencies involved in noise research and development activities. The areas covered by the panels, which are chaired by EPA are: aviation noise, surface vehicle noise, noise effects, and machinery noise. During the first year, the panels have functioned primarily to provide information on agency activities, with virtually no consideration of long range planning. EPA is presently working to expand the scope of consideration undertaken by the panels so that long range planning may be addressed as discussed in Section 6.

Environmental Impact Statement (EIS) Review Process

This discussion covers matters related to the EIS review process and EPA responsibilities in that regard.

Legislative Mandates

Section 102 (2) (C) of the National Environmental Policy Act of 1969 (NEPA) requires that all Federal agencies proposing major actions significantly affecting the quality of the human environment prepare a detailed statement of these environmental effects. Federal agencies are also required to consult with other agencies having legal jurisdiction or special expertise.

Section 309 of the Clean Air Act, as amended, authorizes EPA to review and comment in writing on the environmental impact of

- Legislation proposed by a Federal department or agency.
- Newly authorized Federal construction projects to which Section 102 (2) (C) of NEPA applies.
- Proposed regulations published by a department or agency of the Federal Government.

Such written comment must be made public at the conclusion of any review. In the event such legislation, action, or regulation is determined to be unsatisfactory from the standpoint of public health, welfare, or environmental quality, the determination is published, and the matter referred to the Council on Environmental Quality (CEQ).

EPA EIS Policies and Procedures

EPA has consolidated its NEPA review and Section 309 review into a single advisory review of draft environmental impact statements. EPA also reviews the final EIS to ascertain whether the proposed project is unsatisfactory and should be referred to the Council on Environmental Quality. The EPA Manual, *Review of Federal Actions Impacting the Environment*, of March 1, 1975, establishes the policies and procedures for reviewing and commenting on proposed actions of Federal agencies which will have an impact on the environment. It places management of this program in the EPA Office of Federal Activities (OFA), establishes a decentralized principal reviewer system for the review of these actions, and sets forth a system for rating draft EISs as to both the environmental impact of the proposed action and the adequacy of the impact statement. OFA also develops substantive guidelines for various categories of projects to aid principal reviewers in the preparation of their written comments on EISs.

EPA reviews and comments on approximately 1500 draft and 500 final EISs annually, with the majority of this effort being performed in the regional offices. EPA emphasizes the importance of conducting timely and effective reviews. An important means of this objective is presubmission liaison between EPA and the other agencies. Each region was provided 1 extra man-year for FY74 to improve EIS review performance, particularly to facilitate interaction with Federal agencies at the pre-EIS stage. Presubmission liaison encompasses review of an applicant's environmental report or predraft EIS, attendance at Federal agency meetings in which the action is described, substantive discussion with the Federal agency of a proposed action, provision of background materials for use by a Federal agency in developing an EIS, and review of former EPA program files on a proposed action.

EPA also maintains followup liaison between submission of EPA comments on the draft EIS and submission of the final EIS. The goal is to assure that all projects rated "EU" (environmentally unsatisfactory) or "ER" (environmental reservations) and all statements rated "3" (inadequate information) at the draft stage are changed enough by the final stage so that they are environmentally acceptable. Depending on the significance of the environmental problems that EPA raised in its draft EIS comments, follow-up may consist of reviewing the final EIS on a project. On the other hand, it may involve meeting with the originating agency and other concerned organizations supplying data, interpreting environmental regulations or supplying other technical assistance to the originating agency, attending public hearings and making site visits, and reviewing and commenting informally on preliminary parts on the final EIS.

If liaison and assistance fail to improve project planning and design sufficiently, EPA must express its concerns again at the final EIS stage. Both projects about which EPA has environmental reservations or which EPA determines are environmentally unsatisfactory are referred to CEQ, although referral procedures differ for the two categories. Criteria for making an environmentally unsatisfactory determination include whether the proposed action would result in a probable violation of environmental standards or regulations or whether serious environmental damage would result when mitigating alternatives are readily available.

In addition to evaluating the environmental impact of proposed Federal projects, EPA reviews proposed Federal agency regulations and proposed Federal permits and licenses together with preparing EISs on certain EPA activities. Since April 1973, EPA has systematically engaged in the review of proposed Federal agency regulations impacting the environment, including those regulations for which an EIS has not been prepared. Although EPA has not had the resources to conduct in-depth studies of Federal permit practices, the ENPA process has induced agencies to write programmatic EISs on their land management and permitting programs.

EPA prepares environmental impact statements on certain of its own activities such as wastewater treatment works and new source discharge permits. In addition, as of October 15, 1974, EPA voluntarily prepares EISs on certain of its environmental regulatory activities, including noise emission regulations for new products under the Noise Control Act.

Noise Input to EIS Review Process

The EPA Office of Noise Abatement and Control, in conjunction with the EPA regional offices, participates in the review of EISs in which noise is a factor within the agency framework and procedures just described. The regional offices review the majority of draft statements concerning high-noise impact projects, with headquarters providing guidance and technical assistance as required.

The Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) of the National Academy of Sciences is developing specific guidelines for the preparation and evaluation of environmental impact statements in which noise is a factor. These guidelines will supplement those being issued by OFA, which treat all environmental pollutants for various categories of projects.

The environmental impact statement review process provides an excellent vehicle for EPA to further its noise control objectives and to assure that Federal agencies adopt a uniform approach in controlling environmental noise. As mentioned, on August 16, 1974, the Administrator of EPA wrote the heads of other Federal agencies recommending that they adopt the L_{eq}/L_{dn} methodology described in the EPA "Levels Document" as the uniform methodology for describing environmental noise. A Department of Defense instruction* outlines interim actions for the application of the L_{eq}/L_{dn} methodology to the DOD on-going "Air Installations Compatible Use Zones" (AICUZ) program. In addition, because many different kinds of projects are partially financed by Federal monies, EPA can assure that state and local governments consider the noise implications of their actions through the EIS review process.

Executive Order 11752

The range of Federal agency noise activities covered under Executive Order 11752, "Prevention, Control and Abatement of Environmental Pollution at Federal Facilities," is not as inclusive as those subject to the EIS review process. The Order provides for Federal leadership in the prevention of environmental pollution by requiring Federal facilities to comply fully with applicable environmental standards. Heads of Federal agencies are to ensure that all facilities under their jurisdiction are designed, constructed, managed, operated, and maintained so as to conform to Federal noise emission standards for products adopted in accordance with provisions of the Noise Control Act of 1972 and state, interstate, and local standards for control and abatement of environmental noise. In light of the sovereign immunity principle, Federal facilities are not required to comply with state or local administrative procedures.

E. O. 11752 requires EPA to review and facilitate the compliance of all other Federal agencies with applicable environmental pollution standards. In consultation with OMB and other Federal agencies, EPA is to develop a coordinated strategy incorporating common procedures for an integrated approach for Federal facility compliance and is authorized to issue implementing regulations and guidelines. EPA is further authorized to provide liaison to assure that actions taken by Federal agencies are coordinated with state, interstate, and local environmental control programs and to mediate conflicts between Federal agencies and state, interstate, or local agencies. In the absence of environmental pollution standards for a particular geographic area or class of Federal facilities, EPA may establish standards in consultation with appropriate Federal, state, interstate, and local agencies.

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*October 1, 1974, Memorandum of the Deputy Assistant Secretary of Defense (Installations and Housing).

The EPA Office of Federal Activities (OFA) manages the Agency Federal facilities program designed to discharge EPA responsibilities under Executive Order 11752. Prior to E. O. 11752, the EPA Federal facility program encompassed only the air and water programs, but it now has the additional dimensions of noise, solid waste, marine sanctuaries, radiations, and pesticides. EPA strategy calls for the utilization of an integrated, multimedia approach to Federal facility compliance in which data systems, procedures, and criteria developed for the air and water media will be expanded and refined to incorporate other programs. The strategy as presently structured encompasses:

- The development of a summary environmental inventory to provide baseline data and to enable identification of those Federal facilities that are either existing or potential polluters.
- Evaluation of Federal facility projects to provide recommendations to OMB for funding priorities.
- Monitoring of agency actions to meet established compliance plans and schedules through reviews and site visits conducted by the regional offices.

To implement this strategy, OFA chairs a working group composed of representatives from each program office, selected regional offices and other EPA components, which will determine what implementing guidelines are needed and will assign responsibility for development. All guidelines will be developed in consultation with the other Federal agencies and must have OMB concurrence before they are issued. In FY 75, guidelines relating to land management and operator training will be completed, and development of guidelines on monitoring and testing, multimedia approach to facility clean-ups, and technology transfer will be initiated.

OMB Circular A-106, which was issued in December 1974, established general procedures to be followed by Federal agencies in the control of environmental pollution from existing Federal facilities and incorporated additional requirements of E. O. 11752. In January 1975, EPA issued procedural guidelines that contained standard reporting forms to be used by agencies. Prior to the issuance of A-106 and the EPA procedural guidelines, OMB had directed Federal agencies to submit information to EPA, using a prescribed format, on their on-going and planned environmental control projects, including noise abatement projects. At this time, only the U.S. Navy and Air Force have used this format to identify specific noise abatement projects to abate over-the-fence noise from their installations. The Navy has 21 noise abatement projects requiring total funding of $23,960,000 in FY76, and the Air Force has one FY76 project at $81,000 (See Section 5). In keeping with its responsibilities under E. O. 11752, EPA has assigned priorities to the identified noise abatement projects for FY 76 and has submitted its recommendations to OMB.

In addition to participating in the development of Agency administrative guidelines for E. O. 11752, ONAC is formulating technical guidelines designed to assist Federal facilities in complying with Federal, state and local noise regulations. As presently structured, the guidelines will provide information on acoustic terminology, noise criteria, measuring equipment and techniques, noise levels of major noise sources, noise abatement techniques, and Federal, state, and local noise regulations and ordinances. The guidelines will also include a summary of Federal agency responses to a recent EPA request for information on current and anticipated noise problems at Federal facilities. One outgrowth of EPA technical assistance efforts to formulate and encourage the adoption of model noise legislation will be increased uniformity in the state and local regulations with which Federal facilities must comply.

Assistance Between Agencies

The final mechanisms that may be used to facilitate the integration of Federal noise programs is the provision of technical assistance by one Federal agency to another. A lack of acoustic expertise and access to specialized facilities has created difficulties for the successful coordination of Federal programs, especially at the regional level. Federal agencies and their constituent offices, which are involved only peripherally in noise-related activities, are understandably hesitant to allocate scarce resources to such efforts. To mitigate this deficiency, various agencies have utilized a variety of techniques that include advisory committees, Interagency Agreements, and ad-hoc arrangements among regional offices. In the first category, EPA, the U.S. Army, Navy and Air Force, FAA, NASA, the Public Health Service, and the National Institute of Neurological Diseases and Stroke provide financial support to the Committee on Hearing, Bioacoustics and Biomechanics (CHABA) of the National Academy of Sciences. CHABA, composed of scientists from government, industrial laboratories, and universities, assists supporting agencies in applying available scientific information to solving operational problems and in research planning, exchange of research information, and encouraging research in identified areas.

To obtain specialized support EPA has entered into Interagency Agreements with components of other Federal agencies possessing specialized technical skills and facilities.

Those agencies include the U.S. Air Force Aerospace Medical Research Laboratory, for support in noise health effects research as well as the U.S. Army Construction Engineering Research Laboratory, and the National Bureau of Standards for support in noise instrumentation and monitoring systems.

At the regional level, EPA both provides and receives technical assistance from field offices of other Federal agencies. For example, the EPA Boston Regional office provided equipment, manpower, and data reduction facilities to the HUD regional office in conducting an ambient noise survey for a proposed housing project.

SECTION 4

STANDARDS AND REGULATIONS

Noise standards and regulations promulgated by Federal agencies under their respective statutory authorizations are important elements in the Federal Government efforts in achieving overall noise control objectives. This section summarizes the standards and regulations through which Federal agencies have implemented the statutory mandates.

The section begins with an overview of the entire field of Federal regulations to control noise and summarizes the legislative mandates, action-agency identifications, and regulatory coverage in convenient tabular presentations. More detailed agency-by-agency review is provided in Appendix C. The description of each agency's regulatory program is preceded by a brief description of the enabling legislation on which the regulatory programs are based.

An overview of Federal standards and regulations to control noise must respond to three questions. The tables that follow address each of these questions in sequence:

1. "What regulatory sections of the NCA have been implemented, and by what actions?" (Table 4-1)
2. "What agencies have been involved in what manner in implementing the NCA?" (Table 4-2)
3. "What are the principal areas of regulatory coverage with respect to noise control to date?" (Table 4-3)

IMPLEMENTATION OF THE NOISE CONTROL ACT OF 1972

Table 4-1 relates principal NCA rule-making sections (with the applicable language or a synopsis of the particular statutory provision) to the implementing actions taken to date and cities the action agency or agencies involved. Perusal of the table shows that:

- All NCA sections providing for rule-making have received attention through implementing actions.
- All basic (or initial) action sections (such as NCA Section 5) have been fully implemented.

TABLE 4-1
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
4	FEDERAL PROGRAMS		
4(a)	*Federal agencies to implement noise control policies to fullest extent*	Individual Agency Noise Control Programs; Executive Orders 11612, July 28, 1971, and 11807, September 28, 1974, *Occupational Health and Safety Programs for Federal Employees*, directed fullest application of OSHA Act provisions in Federal agencies. Executive Order 11752 December 17, 1973, *Prevention, Control and Abatement of Environmental Pollution at Federal Facilities*, specifically included compliance with product standards issued under NCA 72 and State, interstate, and local environmental noise standards. OMB issued Circular A-106 in January 1975.	Federal departments and agencies
4(b)	Each Federal agency to *comply with Federal, State, interstate, and local requirements re control and abatement of environmental noise*		OMB – EPA/Federal department and agencies
4(c)(1)	EPA Administrator shall *coordinate all Federal-agency noise research and control programs*	EPA has established and chairs 4 interagency panels to coordinate Federal-agency noise research	EPA and other Federal departments and agencies as concerned
4(c)(2)	Each Federal agency to consult with EPA Administrator in prescribing standards or regulations respecting noise. If agency standards considered inadequate EPA Administrator may request review and report on advisability of revision.	Basis for EPA review of, and comment on panels to coordinate Federal-agency noise research	EPA
4(c)(3)	EPA Administrator shall publish *status and progress report(s)* on Federal noise research and control activities; report shall *describe the noise control programs of each Federal agency* and *assess their contribution* to overall Federal noise control.	Purpose of this report is to comply with this requirement	EPA

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
5	IDENTIFICATION OF MAJOR NOISE SOURCES; NOISE CRITERIA AND CONTROL TECHNOLOGY		
5(a)(1)	EPA Administrator to *develop and publish criteria with respect to noises* indicating *all identifiable effects* on the public health and welfare *from differing quantities and qualities of noise*	Published EPA Document 550/9-73-002, *Public Health and Welfare Criteria for Noise*, July 27, 1973.	EPA
5(a)(2)	EPA Administrator to publish information on *levels of environmental noise requisite to protect public health and welfare with adequate margin of safety*	Published EPA Document 550/9-74-004, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March, 1974; also EPA Document 550/9-74-009, *Population Distribution of the United States as a Function of Outdoor Noise Level*, June, 1974	EPA
5(b)(1)	EPA Administrator to identify products or classes of *products which are major sources of noise*	"Identification of Products as Major Sources of Noise", notice of publication of report in *Federal Register*, Vol. 39, pp. 22297-9, June 21, 1974; identifies first two products, and specifies action under way for next identification set: nine categories of transportation and thirteen categories of construction equipment for further consideration.	EPA

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
6	NOISE EMISSION STANDARDS FOR PRODUCTS DISTRIBUTED IN COMMERCE		
6(a) (1)	EPA Administrator to *publish regulations for each product*		
6(a) (1) (A)	identified as *major noise source* (under Section 5(b) (1), above); and	Section 5 (b) (1), above	EPA
6(a) (1) (B)	for which *noise emission standards* feasible; and	Studies underway	EPA and collaborating Federal agencies and contractors
6(a) (1) (C)	in following categories:		
6(a) (1) (C) (i)	Construction equipment	EPA issued NPRM on Portable Air Compressors,* October 15, 1974, *Federal Register*, Vol. 39, pp. 38186-38205, October 29, 1974 NPRM public hearings held in Arlington, Va. and San Francisco, Cal., February 1975	EPA
6(a) (1) (C) (ii)	Transportation equipment (including recreational vehicles and related equipment)	EPA issued NPRM on Medium and Heavy Duty Trucks*, October 15, 1974, *Federal Register* Vol. 39 pp. 38338-38362 NPRM public hearings held in Arlington, Va. and San Francisco, Cal., February 1975.	EPA
6(a) (1) (C) (iii)	Any motor or engine (including equipment of which they are integral part)	Issued reports on technical and cost data developed for individual sources (e.g. lawn mowers)	EPA
6(a) (1) (C) (iv)	Electrical and electronic equipment	None to date	EPA

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
7	AIRCRAFT NOISE STANDARDS		
7 (a)	EPA Administrator to *study*	EPA published *Report to Congress on Aircraft/Airport Noise*, July 27, 1973 in compliance with NCA Section 7(a)	EPA
(1)	adequacy of FAA *flight and operational noise controls*		
(2)	adequacy of noise emission *standards on new and existing aircraft*, together with recommendations on the *retrofitting and phase-out of existing aircraft.*		
(3)	implications of identifying and achieving *levels of commulative noise exposure around airports*		
(4)	*additional measures* available to airport operators and local governments to control aircraft noise		
7 (b)	FAA retains authority under FAA Act of 1958, Section 611, to *prescribe aircraft noise and sonic boom measurement and emission regulations*	See Table 4-3	DOT/FAA
7 (c)	EPA to *recommend (additional) regulations to FAA if considered necessary to protect the public health and welfare* from noise and sonic boom	See Table 4-3	EPA

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
8	LABELING		
8 (a)	EPA Administrator shall by regulation designate any product:		
8 (a) (1)	which emits *noise capable of adversely affecting the public health and welfare*	CPSC coordinating with EPA on development of power lawn mower standard	EPA and CPSC*
8 (a) (2)	which is *sold on basis of effectiveness in reducing noise*	EPA has issued ANPRM on labeling of Hearing Protectors (ONAC Docket No. 74-3, 11-27-74; 39 FR 42330)	EPA
8 (b)	The Administrator shall require *labeling* of such product *as to noise emitted or effectiveness in reducing noise*	Draft Memorandum of Understanding between the CPSC and EPA submitted by EPA to CPSC 12-17-74	EPA and CPSC

*Consumer Product Safety Commission

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
9	**IMPORTS** *Secretary of Treasury*, in consultation with EPA Administrator, to issue regulations to apply NCA for *new products imported or offered for importation*	EPA Office of Enforcement, with EPA/ONAC support developing recommendations for Treasury/Customs Service procedures: (1) *labeling of new import products* for ready recognition of compliance (2) *proposed revision of present air/water regulations compliance form* (EPA Form 3520-1) to include noise regulations or development of additional new form	Treasury with EPA support

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
10	PROHIBITED ACTS		
10(a)	*Defines violations of*	EPA developing enforcement programs, enforcement procedures in proposed Section 6 regulations (q.v.)	EPA/OE
10(a) (1) and (2)	Section 6		
10 (a)(3) and (4)	Section 8		
10(a) (5)	Section 9		
10(a) (6)	Sections 11, 13, 17, 18		
11	**ENFORCEMENT**		
	Defines penalties and jurisdiction for prosecution of NCA violations	Facility for enforcing noise regulation compliance proposed for EPA/OE	EPA/OE

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
15	**DEVELOPMENT OF LOW-NOISE EMISSION PRODUCTS**		
15(a)(3)	Applies to products ***emitting noise significantly below levels specified in Section 6*** regulations at time of procurement.	EPA has scheduled LNEP study tasks. LNEP Certification Procedures issued as Part 203, Title 40, U.S.C. *Federal Register*, Vol. 39, p. 6670, February 21, 1974	EPA
15(c)(1)	***Federal Government can pay up to 125% of retail price*** of least expensive type of comparable product to procure low noise emission products (LNEP)	Objective low-noise-emission criteria for regulated new products will be published subsequently.	
		EPA participates in interagency Experimental Technological Incentives Program (ETIP) established to develop and test Federal policies for stimulating technological innovation. While not specifically tied to NCA Section 15, two ongoing ETIP projects (power lawn mower and air conditioner procurement experiments) incorporate noise considerations.	EPA/ONAC, GSA/FSS* DOC/NBS, etc.

*Federal Supply Service

TABLE 4-1 (Cont'd)
PROVISIONS OF THE NOISE CONTROL ACT OF 1972, WITH IMPLEMENTING ACTIONS AND ACTION-AGENCY IDENTIFICATIONS

NCA SECTION	*COVERAGE*	*IMPLEMENTING ACTIONS*	*ACTION AGENCIES*
17	RAILROAD NOISE EMISSION STANDARDS		
	EPA Administrator to propose *noise emission regulations for surface carriers* engaged in interstate commerce *by railroad*	Standard proposed New Part 201, 40 U.S.C "Railroad Noise Emission Standards", *Federal Register*, Vol. 39, pp. 24580 24586, July 3, 1974. NPRM public hearing held in Chicago, Ill., August 14, 1974; EPA published Doc. 550/9-74-005a. *Background Document/Environmental Explanation for Proposed Interstate Rail Carrier Noise Emission Regulations*, June 1974.	EPA
	Consult with DOT Secretary	Consultation in progress	DOT/OST
	DOT Secretary to promulgate regulations and enforce *compliance under Safety Appliance, ICC and DOT Acts*		DOT/FRA, ICC
18	MOTOR CARRIER NOISE EMISSION STANDARDS		
18(a) (1)	EPA Administrator to publish proposed *noise emission regulations for motor carriers* in interstate commerce	Standard proposed: *Federal Register*, Vol. 38, pp. 20101-20107, July 27, 1973. Final Regulations: New Part 202, 40 U.S.C. "Motor Carriers Engaged in Interstate Commerce Noise Emission Standards," *Federal Register*, Vol. 39, pp. 38208-38216, October 29, 1974. EPA published Document 550/9-74-017, *Background Document for Interstate Motor Carrier Noise Emission Regulations*, October 1974	EPA
18(a) (3)	*Consult with DOT Secretary*	Consultation completed 1974	DOT/OST
18(b)	DOT Secretary to promulgate regulations and enforce *compliance under ICC and DOT Acts*	Compliance Procedures Proposed: *Federal Register*, Vol. 40, pp. 8658-8666, February 28, 1975.	DOT/FHWA (BMCS), and ICC

TABLE 4-2
IMPLEMENTATION OF THE NOISE CONTROL ACT OF 1972, BY U.S. GOVERNMENT DEPARTMENTS AND AGENCIES

U.S. Government Departments and Agencies	*Departmental Elements*	*Principal Regulatory Issuances to Date*	*Related NCA Sections*
Consumer Product Safety Commission	–	Notice of Proceeding to develop power lawn mower standard	6, 8
		Noise Emission standard for toy guns and caps	6
Environmental Protection Agency	Office of Noise Abatement and Control	Proposed noise emission standards for:	
		Portable air compressors	6
		Heavy and medium duty trucks	6
		Proposed noise emission standard (operational) for surface carriers engaged in interstate commerce by rail	17
		Noise emission standard (operational)for motor carriers engaged in interstate commerce	18
		NPRM proposals submitted to FAA or under development on aviation noise in following areas: – aircraft operations – aircraft type certifications – airport regulations	7

TABLE 4-2 (Cont'd)
IMPLEMENTATION OF THE NOISE CONTROL ACT OF 1972,
BY U.S. GOVERNMENT DEPARTMENTS AND AGENCIES

U.S. Government Departments and Agencies	*Departmental Elements*	*Principal Regulatory Issuances to Date*	*Related NCA Sections*
Environmental Protection Agency (Cont'd)		Comments on OSHA noise standard (see Dept. of Labor, below)	4
		Federal Government programs monitorship: Noise abatement programs Hearing conservation survey OSHA standard application	4
		Certification Procedures for Low-Noise Emission Products	15
General Services Administration (GSA)	Public Buildings Service	*Noise emission limits for equipment employed at government-building construction sites (Para 44.8 in Guide Specification PBS 4-01100, October 1973	4
Housing and Urban Development	Community Planning and Development	*Circular 1390.2 *Noise Control and Abatement*	4
Interior	Bureau of Mines	*Application of Walsh-Healy Act occupational noise exposure limits to underground coal mines and surface work areas 35 FR 5544, 37 FR 6368 (EPA recommends changes)	4

*Implementing actions based on statutory authority enacted prior to NCA

TABLE 4-2 (Cont'd)
IMPLEMENTATION OF THE NOISE CONTROL ACT OF 1972, BY U.S. GOVERNMENT DEPARTMENTS AND AGENCIES

U.S. Government Departments and Agencies	*Department Elements*	*Principal Regulatory Issuances to Date*	*Related NCA Sections*
Interior (Cont'd)	Mining Enforcement and Safety Administration (MESA)	Applies current OSHA standard as mandatory for metal and nonmetallic open pit mines 39 FR 28433 (EPA recommends revisions)	4
Labor	Occupational Safety and Health Administration (OSHA)	*"Occupational Noise Exposure", para 1910.95, OSHA Act, 36 FR 10518 (EPA believes regulation not adequate to protect public health and welfare).	4
Transportation	Federal Aviation Administration (FAA)	*See advisory circulars, rule-making proposals, and Federal Air Regulations listed in Table 4-3	7
	Federal Highway Administration (FHWA)	*Noise standards for highway design: PPM 90-2, noise standards and procedures	4
	FHWA/Bureau of Motor Carrier Safety	*Vehicle interior noise levels (Para 393.94 BMCS regulations) (EPA recommends revision)	4, 18

*Implementing actions based on statutory authority enacted prior to NCA

TABLE 4-2 (Cont'd)

IMPLEMENTATION OF THE NOISE CONTROL ACT OF 1972, BY U.S. GOVERNMENT DEPARTMENTS AND AGENCIES

U.S. Government Departments and Agencies	*Departmental Elements*	*Principal Regulatory Issuances to Date*	*Related NCA Sections*
Transportation (Cont'd)		Proposed compliance procedures for EPA interstate motor carrier noise emission standards 49 CFR Part 325 40 FR 8658	18
Veterans Administration	—	*Manual 26-2, Section VIII, Change 43, 9-24-69, for property near airports; updated and revised by DVB circular 26-74, 9-10-74	4

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*Implementing actions based on statutory authority enacted prior to NCA

- Major action sections of the NCA are receiving continuing attention (as in the case of Sections 6 and 8, considering their evolutionary nature).
- Implementation of NCA Section 15 has been deferred until Section 6 standards become operative.
- Implementation of NCA Section 7 is broad and requires reference to the functional-areas summary in Table 4-3.

DEPARTMENTAL AND AGENCY ACTIVITIES

Table 4-2 lists the action agencies and action-agency components with the regulatory steps they have taken pursuant to the mandates of the NCA and related legislation. It also represents the list of principal agencies with which EPA must collaborate and interact to effect the implementation of the NCA. The list represents only a small part of the Federal Executive Branch, because only principal action agencies responsible for major noise control program portions are shown. The list also has been kept short by omitting separate citations of all agencies that issue internal regulations such as departmental directives and instructions implementing the Executive Order for hearing conservation programs at Federal installations. However, the fact that the actions of the comparatively small number of agencies shown in Table 4-2 have actually resulted in fairly broad initial coverage of noise control problem areas is brought out subsequently in the functionally oriented summaries of Table 4-3.

STATUS OF RULE-MAKING IN FUNCTIONAL AREAS

Table 4-3 groups agency regulatory issuances by functional areas. The functional groups presented are:

- Aircraft noise
- Surface transportation noise
- Products that are major noise sources
- Noise control for housing
- Noise control for the work place.

Aircraft noise control addresses operational regulations, aircraft type certification, and airport noise control. Surface transportation, in this table, delineates regulations covering highway noise control (which will now also apply to instances in which highway funds are to be used for mass transit projects), vehicles using the highways, railroads, and other surface transportation.

The "Products" category includes the first construction equipment item to be regulated as a major noise-source product (portable air compressors), although much construction equipment is mounted on vehicles for mobility and therefore could, with almost equal logic, be grouped with the transportation equipment as a source of community noise.

The last two categories in Table 4-3, "Housing" and "Work Place Protection", are unique in that the regulations treated here set standards of acceptability of exposure to noise. Protection from the actual noise exposure can be achieved by countermeasures when the control of the noise source is not yet feasible or adequate.

The entire picture that emerges from the perusal of Table 4-3 is that of an impressively broad and well-oriented initial attack on the problem of noise. The efficacy of that attack will depend on the timing of, and compliance with, the full array of regulatory actions, including the many listed as awaiting full application and implementation.

TABLE 4-3
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
1. Aircraft Noise						
2. Flight Procedures						
(1) Takeoff	DOT/FAA	AC 91-39 1-18-74				*Takeoff Procedures for Noise Control.* "Get-'em High Earlier" takeoff procedure, initiated by FAA and ATA 1972.
	EPA			NPRM proposal to be submitted to FAA (EPA #1)**		*Takeoff Procedures for Noise Control.* Would extend benefits of AC 90-59 (see minimum altitudes, below) by additional takeoff procedures to alleviate sideline noise and near and far down-range noise.
(2) Approach and Landing	DOT/FAA		ANPRM 74-12 3-26-74			*Two Segment ILS Noise Abatement Approach* Would require use of a two-segment approach to reduce noise footprint of aircraft on landing approach. Initial part of descent would be steeper (6°) than conventional glide slope angle. Final segment would conform to glide slope angle (3°). Would apply at about 60 U.S. airports.

*FAA Advisory Circulars inform the aviation public of nonregulatory material of interest. They are not binding as are regulations.

**Refers to item numbers of (revised) list of rules to be proposed by EPA to FAA (See Notice of Public Comment Period, 39 FR 6112, February 19, 1974).

TABLE 4-3 (Cont'd.)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(2) Approach and Landing (Cont'd)	EPA			NPRM proposal to be submitted to FAA (EPA #2)		*Approach and Landing Procedures for Noise Control.* EPA endorsed approach in ANPRM 74-12 but also will recommend inclusion of use of reduced flap settings.
(3) Minimum Altitudes	DOT/FAA	AC 90-59				*Arrival and Departure Handling of High Performance Aircraft.* "Keep-'em High" procedure for noise abatement. Requires minimum altitudes for turbojet powered airplanes of 5,000 feet for IFR operation in the vicinity of airports, except as dictated by safety or other operational requirements. Also encourage VFR usage by these aircraft.
	EPA			Proposed NPRM submitted to FAA 12-6-74 (EPA #3) FAA NPRM 74-40 40-FR 1072 1-6-75		*Noise Abatement Minimum Altitudes Within Terminal Areas; Turbojet Powered Airplanes.* Would require all turbojet aircraft (both IFR and VFR) to comply with the altitude limitations and operational procedures of Advisory Circular 90-59. Would also restrict descent below 3,000 feet to rates consistent with ILS glide slope.

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*FAA Advisory Circulars inform the aviation public of nonregulatory material of interest. They are not binding as are regulations.

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(3) Minimum Altitudes (Cont'd.)	FAA	AC 91-36 7-8-72				*VRR Flight Near Noise-Sensitive Areas.* Pilots making VFR flights near noise sensitive areas (schools, nursing homes, hospitals, recreation areas, wildlife areas) to fly not less than 2,000 feet above the surface although flights at lower levels may be and in conformance in FAR 91.79 minimum safe altitude.
(4) Sonic Boom	DOT/FAA			NPRM 70-16 4-10-70	FAR Part 91.55 4-27-73	*Civil Aircraft Sonic Boom.* Prohibits operation of a civil aircraft at a true flight Mach number greater than 1 over the United States and its territorial waters unless authorized by the FAA. Proposed to prohibit supersonic flights by civil aircraft over the United States.
B. Type Certification (1) Aircraft Noise Emissions Standards. Subsonic transport category airplanes and subsonic turbojet powered airplanes.	DOT/FAA				FAR Part 36	*Noise Standards: Aircraft Type Certification.* Sets noise level limits at three locations around a runway for type certification of new aircraft designs. Effective 12-1-69.

TABLE 4-3 (Cont'd)

STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
B. Type Certification (Cont'd)	DOT/FAA			NPRM 71-26 9-13-71	Amendment to FAR Part 36 12-12-74	*Noise Type Certification and Acoustic Change Approvals.* Detailed proposed changes for FAR 36 to improve certification procedure and define more carefully what constitutes an "acoustic change" for an aircraft design so that new certification for noise is initiated. Amendment effective 1-20-75.
	DOT/FAA			NPRM 72-19 7-7-72	FAR Part 36 10-26-73	*Noise Standards for Newly Produced Airplane of Older Type Designs.* New aircraft shall comply with the noise level standards of FAR, Part 36, (a) after 12-1-73 for aircraft weighing more than 75,000 lbs, except those powered by P&WA JT&D engines; (b) after 12-31-74 for all aircrafts.
	EPA			NPRM proposal to be submitted to FAA		*Modification to Federal Aviation Regulations (FAR 36)*
(2) Civil Supersonic Aircraft	DOT/FAA		ANPRM 70-33 8-4-70			*Civil Supersonic Aircraft Noise Type Certification Standards.* Proposed to establish standards for civil SST's. No further action on this Advance Notice since 1970.

TABLE 4-3 (Cont'd)

STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	***Notice of Proposed Rule-Making***	***Standard or Regulation***	
(2) Civil Supersonic Aircraft (Cont'd.)	EPA			NPRM proposal submitted to FAA 2-28-75 (EPA #5)		*Aircraft Noise Requirement-Civil Supersonic Airplanes.* Recommends FAA issue two proposed rules for public comment. Proposed Regulation for Future Types and Later Production Versions of Current Types of SSTs: (applicable to foreign and domestic air carriers) • Applicant for type certificate for civil supersonic airplane required to show compliance with noise requirements for FAR Part 36 effective on date of application of a type certificate. • Current type supersonic airplanes except those upon which substantive productive effort has been commenced prior to the date this regulation proposed, must meet present FAR Part 36 (effective 1 December 1969) noise requirements. Proposal cites 8 regulatory options applicable to initial production version of current SSTs. EPA favors regulation based on Option 3 (Allow SST Operation at Designated Airports with Restriction) but encourages full discussion through public hearing process.

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(3) Retrofit Fleet Noise Level	DOT/FAA		ANPRM 70-44 10-30-70			*Civil Airplane Noise Reduction Retrofit Requirements.* Proposed engineering modifications to older design civil aircraft for noise reduction purposes.
	DOT/FAA		ANPRM 73-3 1-24-73			*Civil Airplane Fleet Noise Level (FNL) Requirements.* Proposed modifications for all civil transport aircraft to civil transport aircraft to meet FAR 36 noise levels, using a "fleet noise rule" to insure progressively lowered steps over several years until complete compliance by 7-1-78. Inactive.
	DOT/FAA			NPRM 74-14 3-27-74		*Civil Aircraft Fleet Noise Requirements.* Proposal to require all civil subsonic jet aircraft weighing over 75,000 pounds to comply with FAR 36 after 6-30-78, with at least one-half of the engine nacelles of each air carrier fleet complying after 6-30-76.

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(3) Retrofit Fleet Noise Level (Cont'd.)	EPA			NPRM proposal submitted to FAA (EPA #4) (1-29-75)		*Civil Subsonic Turbojet Engine-Powered Airplanes. Noise Retrofit Requirements.* Proposal to amend FAR Part 91 differs from FAA NPRM 74-14 principally in regard (1) to its applicability and (2) the required installation of engines/nacelles listed by an operator. (1) Requires all civil subsonic turbojet engine-powered airplanes *regardless of weight* to comply with FAR 36 after 6-30-78. (2) Requires scheduled installation of each engine/nacelle on operational airplanes of the operator, if he lists such engines/nacelles as part of his "on-the-shelf" inventory.
				NPRM proposal submitted to FAA (EPA #4) (1-29-75)		*Fleet Noise Level Requirement.* Proposal to amend FAR Parts 121 and 129. Prescribes noise data and information reporting requirements f for computation of Fleet Noise Level (FNL) effective on and after 1-1-76 for operation within U.S. of any civil subsonic or future subsonic turbojet engine-powered airplane by each certificate holder.

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(4) Small Aircraft	DOT/FAA			NPRM 73-26 10-10-73 38 FR 23016	Amendments to CFR 14, Chapter 1 Parts 21 and 36 40 FR 1029 1-6-75	*Propeller-Driven Small Airplanes Noise Standards.* Prescribes noise standards. Propeller-driven aircraft weighing less than 12,500 lbs., for type certification requested on or after 10-10-73 and for all types manufactured after 1-1-80.
	EPA			NPRM proposal submitted to FAA (EPA #7) 12-6-74 FAA NPRM 74-39 40 FR 1061 1-6-75		*Noise Standards for Propeller-Driven Small Airplanes.* Proposes noise standards for propeller-driven small airplanes applicable to new type designs, newly produced airplanes of older type designs, and to the prohibition of "acoustical changes" in the type design of those airplanes. Proposals contain differences from FAA NPRM 73-26 in regard to key elements of noise evaluation measures, noise complaince levels, performance correction, and flight procedures.
(5) Short Haul Aircraft (V/R/STOL)	DOT/FAA		ANPRM 73-32 12-14-73			*Noise Standards – Short Haul Aircraft.* Proposed to consider noise standards for STOL, RTOL, and VTOL aircraft and invited suggestions regarding certification concepts and noise evaluation units.
	EPA			NPRM proposal to be submitted to FAA (EPA #8)		*Short Haul Aircraft*

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
C. Airport Noise	EPA			Proposed regulation package to be submitted to FAA (EPA #9)		EPA has study in progress; work on regulation started in September 1973

TABLE 4-3 (Cont'd)
STATUS OF RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
2 Surface Transportation Noise						
A Highways	DOT FHWA				PPM 90-2 2-8-73	*Noise Standards and Procedures.* Specifies design noise levels (LIO) and land-use relationships. *Category* — *LIO* — *Land use* A — 60 dBA — Trucks where serenity and quiet are of extraordinary importance B — 70 dBA (ext.) — Residences, Motels, Hospitals, Parks C — 75 dBA (ext.) — Developed areas not in A or B D — (special treatment) E — 55 dBA (int.) — as for category B NOTE: EPA has requested FHWA to accept converstion to L_{dn}/L_{eq} system.

TABLE 4-3 (Cont'd)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
	DOT/FHWA			NPRM Docket No. 74-6 39 FR 32618 9-10-74		*Noise Standards and Procedures* Formally proposes incorporation of PPM 90-2 specifications as Chapter 1, Title 23 CFR, Part 772, sections 772-1-12; design noise levels given in both Leq and L10.
3 Motor Carriers (Interstate) Note: see also 3 Commercial Products B Transportation Equipment (Heavy and medium duty trucks), below	EPA			NPRM 7-27-73 38 FR 20101	Final Reg. 10-29-74 39 FR 38208	*Motor Carriers Engaged in Interstate Commerce: Noise Emission Standards*: 86 dBA at 35 mph or less; 90 dBA at more than 35 mph; stationary test: 88 dBA
	DOT/FHWA			NPRM 2-28-75 40 FR 8658		*Proposed Compliance Procedures* Proposes regulations establishing methodologies for determining whether commercial motor vehicles conform to EPA Interstate Motor Carrier Noise Emission Standards.

TABLE 4-3 (Cont'd)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
C. Railroad Noise Emissions	EPA			NPRM 7-3-74 39 FR 24580		*Railroad Noise Emission Standard* New Part 201 to Title 40 CRF would apply noise controls to all rail cars and all locomotives (except steam locomotives) operated or controlled by carriers in the Continental U. S. subject to the Interstate Commerce Act. Applies under both stationary and moving conditions, with near-term (270 days) and long-term (4 years) deadline specifications for compliance.

TABLE 4-3 (Con't)

STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
3 Commercial Products						
A Construction Equipment	EPA			NPRM 10-15-74 39 FR 38186		*Noise Emission Standards for Construction Equipment Proposed Portable Air Compressor Standards* Effective one year from promulgation new portable air compressors shall be so designed, built and equipped as not to produce during life of product average sound level in excess of 76 **dBA**.
	GSA				Par. 44.8 Guide Specifications PBS 4-01100 October 197	*Noise Emission Limits for Construction Equipment* Applicable to equipment employed at government-building construction sites.
B Transportation Equipment	EPA			NPRM 10-15-74 39 FR 38338		*Transportation Equipment Noise Emission Controls Proposed Standards for Medium and Heavy Duty Trucks* Newly manufactured vehicles shall be designed and equipped so as not to exceed the following low-speed sound emission levels: 83 **dBA** for 1977-1980 models, 80 **dBA** for 1981 and 1982 models; 75 **dBA** for 1983 and subsequent model years.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
C. Hearing Protectors	EPA		ANPRM 11-27-74; 39 FR 42380 12-5-74			*Hearing Protectors* Proposal to designate hearing protectors as a product sold wholly or in part on the basis of their effectiveness in reducing noise and to require labeling as to their noise attenuation capability (NCA Section 8) Comment deadline 2-1-75.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
D. Power Lawn Mower	CPSC		Notice of Proceeding 7/17/74 39 PR 26662			*Consumer Products Safety Standard for Power Lawn Mowers.* Announcement of plan to develop a safety standard for power lawn mowers by June 19, 1975 to include prevention of "potential for hearing loss and non-auditory trauma from exposure to excessive noise." First CPSC standard to include protection from noise.
E. Toy Guns and Caps	CPSC				Title 16, Chapter II, Subchapter C, Part 1500 9/27/73	CPSC reissued HEW regulation under Federal Hazardous Substances Act which bans sale of toy guns and caps in violation of noise emission standards.
F. Low-Noise-Emission Products	EPA			NPRM 5/2/73 38 FR 1082		*Low-Noise Emission Products (LNEP) Certification Procedures.* Proposed regulations to implement NCA Section 15.
	EPA				Title 40, Chapter I, Subchapter G, Part 203, 2/13/74	*Low-Noise Emission Products (LNEP) Certification Procedures.* Regulations to implement NCA Section 15.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
4. Housing Exterior/Interior Noise Standards	HUD				Departmental Circular 1390.2	*Noise Abatement and Control:* Departmental policy implementation responsibility and standards. Standards for new constructions. *General Exterior Exposure:* not to exceed 65 dBa for more than 8 out of any 24 hours; *Aircraft-Noise Exposure near Airports:* Composite Noise Rating less than 100; Noise Exposure forecast less than 30. *Interior Areas:* Not to exceed 55 dBa for more than 60 minutes in any 24-hour period; not to exceed 45 dBa for more than 8 hours of any 24-hour period. *Sleeping Quarters:* Not to exceed 45 dBa for 30 minutes during 11 pm to 7 am period. NOTE: EPA has recommended HUD adopt L_{eq}/L_{dn} environmental noise description.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
4 Housing (Cont'd)	VA				Manual M 26-2 Change 43 9-24-69	*Appraisal of Residential Properties near Airports.* Nationwide predetermined formulas for measuring depreciation allowances due to airport proximity not considered advisable or practical. Response of residential communities to composite noise ratings makes properties exposed to noise from takeoffs and landings in excess of 115 per day and runups in excess of 95 per day unacceptable.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
5. Noise in Work Place						
A. Occupational Noise Exposure, General	DOL/OSHA				OSHA para 1910.95 36 FR 10518 5-29-71	*Occupational Noise Exposure.* Specifies permissible noise exposures from 90 dBA for eight hours per day to 115 dBA for 1/4 hour or less. Exposure to impulsive noise limited to 140 dBA. EPA has advised DOL it considers standard not adequately protective of public health and welfare.
	DOL/OSHA			NPRM 39 FR 37773 10/24/74		*Occupational Noise Exposure.* Retains existing 90 dBA exposure limit as an 8 hour time weighted average and 5 dB time/intensity trading ratio. EPA believes proposed revision is not adequately protective and has requested a formal review of proposal under procedures of NCA Section 4 (c) (2).

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
B. Special Applications						
(1) Coal Mines, Underground	DOI/BuMines				Title 30, Chapter 1, Subpart 0, Part 70 4-1-70 35 FR 5544 4-3-70	*Noise Standard for Underground Coal Mines.* Occupational noise exposure shall comply effective 6-30-70 with the standards of the Walsh-Healy Public Contracts Act, as amended, in effect on **10-21-69 for 90 dBA not to exceed 8 hour exposure per day and exposure to impulsive of impact noise not to exceed 140 dBA peak sound** pressure level. EPA conceived on a tentative basis due to non-availability of (adequate) technology but required further study.
(2) Coal Mines, Surface Work Areas	DOI/BuMines				Title 30, Chapter 1, Subpart 0, Part 71 3-22-72 37 FR 6368 3-28-72	*Noise Standard for Surface Work Area. Mandatory Health Standards.* Extends underground mine noise standard to surface work areas.

TABLE 4-3 (Con't)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	***Standard or Regulation***	
(3) Metal and Non-Metallic Open Pit Mines	DOI/MESA				Part 55, Title 30 CFR, para 55.5 (amended); 39 FR 28433-4, 8-7-74	*Noise Control Standards* Promultages current OSHA standard as mandatory. EPA has concurred subject to assurance that DOI will promptly present to FMNMSAC DOI's recommendation to accept EPA recommendations (1) of lower exposure levels and a complete hearing conservation program and (2) the current revision of the OSHA standard under review by DOI.

TABLE 4-3 (Cont'd)
STATUS OR RULE MAKING: STANDARDS, REGULATIONS, AND EXECUTIVE ORDERS

NOISE CONTROL AREA	*ISSUING AGENCY*	*TYPE OF REGULATORY ISSUANCE*				*TITLE AND BRIEF DESCRIPTION*
		*Advisory Circular**	*Advance Notice of Proposed Rule-Making*	*Notice of Proposed Rule-Making*	*Standard or Regulation*	
(3) Hearing Protection in Vehicles	DOT/FHWA (BMCS)		ANPRM 10-28-70 35 FR 17194	NPRM 12-22-72	Title 49, Chapter III, Subchapter B, Part 393 38 FR 30880 11-8-73	*Vehicle Interior Noise Levels* Effective 4-1-75, vehicles manufactured on or after 10-1-74 when first operated and vehicles manufactured before 10-1-74 and operated subject to the jurisdiction of **BMCS** must conform to new para 393.94 of the Motor Carrier Safety Regu. setting interior sound level limit at drivers seating position of a motor vehicle not to exceed **90 dBA. EPA has** requested **BMCS** to consider lowering of standard to reflect recommendations of EPA Levels Document.

SECTION 5

NONREGULATORY NOISE CONTROL PROGRAMS

For the purposes of this section the term "nonregulatory noise control programs" encompasses all Federal agency noise related activities, with the exception of research, development, and demonstration (RD&D) programs discussed in Section 6 and the development and implementation of standards and regulations covered in Section 4. The nonregulatory noise control programs are presented in this Section in the following categories: Hearing Conservation, Noise Abatement, and Technical Assistance.

- Hearing conservation programs are directly concerned with the prevention of hearing loss, and most agencies operate such programs even though in some cases noise exposure levels are well below the maximum levels specified by the Occupational Safety and Health Administration.
- Noise abatement programs are primarily activities undertaken by agencies to control noise generated by their own facilities and operations to reduce noise impacts on surrounding communities and to provide a quieter environment for their employees. Several Federal agencies have noise abatement programs. However, DOD programs are the most expensive, due to the relatively high noise levels associated with military activities and the extent of DOD operations.
- Technical assistance programs are conducted by several agencies to augment the effectiveness of noise programs by supporting activities of state and local levels of government.

This section summarizes reported Federal agency nonregulatory noise control programs. Detailed program descriptions, by agency, are provided in Appendix C. The primary sources of information used were official agency responses prepared in accordance with information guidelines developed by EPA and contained in Appendix A. Although these guidelines incorporated requests for specific types of data, the format provided sufficient latitude to allow agencies to properly characterize their noise control activities. In some instances, the manner in which the agencies reported on their programs and the nature of the programs themselves are not well suited to division into the three functional categories of hearing conservation, noise abatement, and technical assistance programs. For example, engineering control measures designed to reduce noise levels may be initiated both for hearing conservation purposes and to minimize community impact. Therefore, in a few cases the distinction is not sharp as to whether a particular activity is "hearing conservation," "noise abatement," or "technical assistance." In most cases, however, the distinction is clear.

HEARING CONSERVATION PROGRAMS

Occupational noise-induced hearing loss is a serious threat to the public health and welfare, both in terms of the large numbers of workers exposed to potentially hazardous noise levels and the severe social, vocational, and emotional problems resulting from hearing loss. In industry, there are more people with occupational hearing loss than there are with all other occupational diseases such as silicosis, emphysema, radium poisoning, and lead poisoning combined. The Public Health Service has estimated that there are some 10 million people with hearing loss in American industry, and it is probable that a large portion of these losses are related to excessive noise exposure.

The magnitude of the problem, coupled with the fact that hearing loss produced by exposure to excessive noise is presently irreversible, necessitates Federal action to eliminate noise-induced occupational hearing loss. In addition to the psychological and social effects of hearing loss, the compensatory aspects of occupational hearing loss add to the seriousness and complexity of the overall problem. The number of claims that have been paid and future claims may run into the hundreds of millions of dollars in direct costs. Estimates obtained from the Office of Federal Employees' Compensation (OFEC) within the Labor Department indicate over 4,000 OFEC hearing loss cases for calendar year 1973. The number of Federal employee hearing loss cases is expected to increase in future years, and it has been estimated by OFEC that over 80 percent of claims filed result in awards.

Financial considerations aside, the Federal government is committed to set an example to the private sector in protecting the safety and health of its employees. Noise-induced occupational hearing loss is almost entirely preventable. Where feasible engineering and administrative controls fail to reduce employee noise exposure to acceptable levels, institution and enforcement of effective hearing conservation programs are imperative. To assure safe and healthful working conditions for their employees, and in response to regulations and procedures promulgated under the Occupational Safety and Health Act of 1970, various Federal agencies have instituted hearing conservation measures.

As used in this report, the term hearing conservation includes those activities directly concerned with the prevention of hearing loss among personnel–government and contractors–whose occupation exposes them to potentially harmful levels of noise. All such programs involve periodic hearing testing (audiometry) and may include all or some of the following activities:

- Noise surveys
- Reduction of noise at source
- Reduction of exposure through administrative controls (scheduling)
- Training programs of which hearing conservation is a part
- Use of hearing protection devices.

Excluded from this category are those activities involving research on the effects of noise on the auditory system.

Authority for EPA Participation

The legal basis for EPA involvement in the area of occupational noise derives from Section 4 of the Noise Control Act. Under Section 4 (c) (1) of the Act, EPA is required to coordinate all Federal noise research and noise control programs, and under Section 4 (c) (2), Federal agencies are directed to consult with EPA in prescribing noise standards or regulations. No distinction is made in Section 4 between Federal programs relating to environmental noise and those relating to occupational noise. The inclusion of Federal hearing conservation programs is an integral part of any report on the status and progress of Federal noise activities.

Existing Procedures and Regulations For Federal Agency Hearing Conservation Programs

Requirements for Federal civilian employee health service programs have been in existence since 1948, and the military was first to establish occupational noise exposure regulations. The present legislation governing occupational exposure to noise is the Occupational Safety and Health Act of 1970, which authorizes the development and enforcement of standards to assure safe and healthful working conditions for employees in the private sector. Section 19 of the Act assigns each Federal agency head the responsibility for establishing and maintaining an effective and comprehensive occupational safety and health program, consistent with the standards promulgated by the Secretary of Labor for businesses affecting interstate commerce. To implement this Section of the Act, Executive Order 11612 was signed on July 28, 1971, which validated and extended previous policies and generally specified the respective duties of Federal department and agency heads, the Secretary of Labor, and the Federal Safety Advisory Council for the establishment and maintenance of Federal occupational safety and health programs. The Order included a requirement that each Federal department and agency head submit an annual report to the

Secretary of Labor on the status and objectives of the program, and, in turn, the Secretary of Labor was directed to submit an annual analysis of Federal safety programs to the President.

An occupational noise exposure standard was promulgated by the Department of Labor on May 29, 1971, and, in accordance with the provisions of E.O. 11612, Federal occupational safety and health programs must be consistent with this standard. The OSHA standard limits an employee's exposure to 90 dBA as, an 8-hour time weighted average. The standard provides that exposure intensity may be increased by 5dB for each halving of exposure time, with a maximum sound level of 115 dBA for 15 minutes or less. The standard recommends that exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level. When employees are subjected to sound levels exceeding the stipulated permissible noise exposures, the standard requires that feasible administrative or engineering controls be utilized. If such controls fail to reduce sound levels within the specified limits, personal protective equipment is to be provided and used. In all cases in which the sound levels exceed the permissible values, effective hearing conservation programs are to be administered.

E.O. 11612 and the OSHA noise exposure standard, respectively, provide the presently applicable policy directive and regulatory basis for Federal agency hearing conservation programs. The results of an EPA pilot study and the summary descriptions of reported Federal agency hearing conservation programs treated subsequently in this section should be viewed in light of these procedures and regulations. Of particular importance is the absence in the OSHA standard of detailed specifications for the operation of an effective hearing conservation program, which may account for the observed wide variations among Federal programs. In addition, several agencies have adopted more stringent noise exposure standards as the basis for their programs, since the Occupational Safety and Health Act is not preemptive in this respect.

Recent Developments

The recent issuance of Executive Order 11807 "Occupational Safety and Health Programs for Federal Employees," the Department of Labor promulgation of "Safety and Health Provisions for Federal Employees," and the proposed revision to the OSHA occupational noise exposure standard should affect the future orientation and content of Federal hearing conservation programs.

E.O. 11807, signed on September 28, 1974, reaffirms the Federal Government commitment to set an example in the provision of a safe and healthful working environment for employees. E.O. 11807 enumerates in greater detail and expands the responsibility of agency heads and the Secretary of Labor from that contained in E.O. 11612. The new Order calls for increased requirements for agency record-keeping and reporting and a significant expansion by DOL of detailed guidance and assistance to Federal agencies. Finally, additional employee consultation is provided for, and a new requirement for employee safety and health training is incorporated. The Department of Labor published "Safety and Health Provisions for Federal Employees" on October 9, 1974, which specifies regulations and guidelines for implementation of additional DOL responsibilities under the new Executive Order. These two issuances, with their emphasis on structured guidance to Federal agencies for conducting occupational safety and health programs, should result in increased uniformity in Federal hearing conservation programs. The strengthened reporting and recordkeeping provisions may provide a mechanism for evaluating the efficacy of such programs.

On October 24, 1974, DOL published in the *Federal Register* the proposed revision to the occupational noise exposure standard. The proposed standard retains the 90 dBA limit for an 8-hour exposure as well as the present 5dB doubling rate for halving exposure duration. While stating that "comparatively more workers will be at lower risk at 85 dBA than at 90 dBA," DOL "proposes to keep the level at 90 dBA until further empirical data and information on the health risk, feasibility, and economic impact indicate the practicality and necessity of an 85 dBA requirement."

The DOL proposal requires establishment of a stringent hearing conservation program beginning at 85 dBA, a requirement with which EPA concurs. The proposed standard specifies an audiometric testing program that includes baseline and annual audiograms for employees exposed to a workday average of 85 dBA and above and for all employees using personal protective equipment. If an employee's annual audiogram indicates a significant threshold shift in either ear when compared to the baseline audiogram, a retest after 1 month is required. The proposal instructs employers to notify workers of any significant shifts in hearing level indicated in the testing. Sound level monitoring and maintenance of records are explicitly required in the proposal, and, as in the case of audiometric testing, specifications for procedures and for calibration and accuracy of instrumentation are stipulated.

This proposal has important implications for the conduct of Federal agency hearing conservation programs that are presently administered without the benefit of such explicit DOL requirements. EPA views an effective hearing conservation program as a supplementary measure to engineering and administrative controls rather than as a permanent solution to controlling occupational noise exposure. EPA has included recommendations on such programs as part of its critique of the proposed OSHA standard. Further explanation of the EPA position is contained in Appendix C (Department of Labor).

EPA Pilot Study of Federal Agency Heating Conservation Programs

As part of its responsibility to report on the status and progress of Federal noise research and control activities, EPA conducted a pilot study to develop and field test a questionnaire that may subsequently be used to determine if hearing conservation is being satisfactorily implemented by Federal agencies and if such programs are succeeding in preventing occupational hearing loss. In the future, the field tested questionnaire (contained in Appendix B), accompanied by an Instruction and Definition Manual, may be distributed to a representative sample of the approximately 20,000 Federal installations, of which 2000 to 2500 are estimated to account for the majority of noise exposure problems. The survey results should provide a data base for a detailed assessment of Federal agency hearing conservation programs.

Such a comprehensive assessment of the weaknesses and strengths of ongoing Federal agency hearing conservation programs might be used to:

- Provide an estimate of how adequately Federal employees are being protected against hearing loss.
- Furnish private industry with information and guidance to augment the effectiveness of existing hearing conservation programs.
- Identify, through delineation of agency noise exposure problems and related incidences of hearing loss, needed areas of research with workplace applications.

Methodology of Pilot Study

In light of the Occupational Safety and Health Administration responsibilities under E.O. 11612, and as reinforced in E.O. 11807, to evaluate data on Federal occupational safety and health programs and to submit reports setting forth such evaluations to the President, EPA has solicited OSHA advice and cooperation in collecting hearing conservation data for this report. A questionnaire, which was reviewed and found acceptable by OSHA, was distributed to 12 installations representing five selected Federal agencies. The facilities selected had both significant noise exposure problems and fully operational hearing conservation programs.

To assess the questionnaire's value as a general survey instrument at any Federal installation, a team of experienced hearing conservation specialists visited the 12 locations. By first hand observations and lengthy conferences with responsible individuals at each site, these specialists were in a position to judge the usefulness of the questionnaire to properly reflect the actual conditions observed.

Observations and Recommendations

As a byproduct of the pilot study, the team of experts observed patterns and practices that were common to the installations surveyed. Obviously, 12 site visits do not constitute a sufficiently large sample from which broad inferences can be drawn applicable to all Federal programs. However, those observations are cited to critically identify measures that may have more widespread application in increasing program effectiveness. This is particularly significant since costs for effective programs are relatively small and since, in most instances, programs can be conducted for less than most installations visited are currently spending (excluding the cost of physical noise control measures).

The experts who conducted the study had several observations, which are discussed in the following paragraphs.

1. Overall administrative responsibility and authority for implementation and integration of all hearing conservation activities are almost unknown in all installations visited. Designation of an approved official (such as the Director, Occupational Health Services or other suitable functionary) sufficiently empowered to direct the program is sorely needed at each facility.
2. Hearing conservation programs tend to be fragmented at the operating level into components such as job site noise measurements or performance and filing of routine employee audiograms. This fragmentation, with no overall administrative direction, tends to obscure the basic objective of a hearing conservation program, namely, to prevent hearing loss and to detect employees with hearing losses so that further loss can be prevented.
3. Specific program funding for all contributing departments or divisions of a facility is lacking. As a result, there is insufficient balance in staff personnel for the necessary segments of the program.
4. Coordination between personnel in various departments is almost universally a problem. For example, employee transfers from one department to another with differing noise exposures are not known or recorded on audiograms, thereby preventing adequate evaluation of test results.
5. Rarely is there any formal placement criteria for specific job descriptions relating to allowable noise environments.

Functional Components of Hearing Conservation Programs

Observations in the conduct of the following elements of a hearing conservation program were made: (1) Noise surveys, (2) Engineering controls, (3) Audiometric testing, (4) Training and education, and (5) Use of hearing protectors.

1. *Noise Surveys.* Noise survey policies differ from one installation to another with respect to comprehensiveness, frequency, and methodology. Walkthrough surveys are the rule regarding typical noise-producers such as power plants, generator

systems, and shredding equipment. In production or experimental areas, practices vary from surveying upon supervisors' request to surveying upon complaints from employees. A practice frequently observed is the taking of readings in general areas rather than surveying the sound pressure levels at the operator's position. Better cooperation between noise survey personnel and production engineering is clearly needed to permit restudy when new equipment is installed or when fundamental changes in processing occur. Recognition and surveying of work areas with noise levels below 90 dBA is frequently lacking.

2. *Engineering Controls.* Noise abatement through engineering suffers from staff deficiencies in many cases. Also, the use and enforcement of engineering controls appear to have been assigned low priority.

3. *Audiometric testing.* Numerous weaknesses in the audiometric testing programs were identified.

   a. Facility-wide pre-employment or baseline audiograms are seldom performed.

   b. Quiet periods (14 hours of non-exposure to noise) before audiometric testing are not required or provided for in most installations. The probability of recording temporary threshold shifts is increased, and technicians are often required to repeat the audiometric tests.

   c. It appears that the otological training or experience of program directors is not always adequate to interpret audiograms. Proper interpretation of audiograms for diagnostic and remedial purposes is a widespread problem.

   d. In most instances, the audiometric testing procedures were adequate, although not uniform in their specific techniques. Hearing conservation programs would be improved if periodic refresher courses for personnel were provided.

   e. Medical recordkeeping varies broadly, depending upon the agency involved. A uniform, computerized Federal system would be beneficial. Medical records ought to provide information on the relative success of hearing conservation programs and ought to point out areas where hearing loss is occurring. It also appears that little use is made of audiometric records in the processing of compensation claims.

4. *Training and Education.*

   a. Employee educational programs are generally perfunctory and are not comprehensive or repeated with sufficient frequency.

   b. Training programs for hearing conservation personnel should be more thorough and more practical. Such practical training should include standardized recordkeeping and audiometric techniques, efficient scheduling of tests with minimum lost time, and care and use of hearing protective equipment.

5. *Use of Hearing Protectors.* Hearing protectors are frequently not worn as required, and their use is not adequately supervised.

Summary Descriptions of Federal Hearing Conservation Programs

A complementary view to the implementation of hearing conservation programs at the 12 installations surveyed is provided by a headquarters-level perspective, as reported by the respective agencies, of each federal agency noise exposure problems and the hearing conservation efforts instituted to correct them.

Types and Limitation of Information Available to EPA

In describing Federal agency hearing conservation programs, the primary source of data was the official agency submittals in response to EPA information guidelines. Both the guidelines and the list of the 38 agencies from which information was requested are contained in Appendix A of this report. The official submittals have been supplemented and amplified to some extent by analysis of the provisions of agency policy directives, instructions, and noise survey reports as well as by data and insights available to EPA as a result of prior coordination activities. Every attempt has been made, however, to retain the flavor and orientation of the original submittal and to differentiate EPA observations from agency statements.

No attempt was made to provide detailed assessments or comparisons of Federal agency hearing conservation activities for this report. Any such analysis would have to account for the following considerations:

- The primary determinant of the need for and extent of a hearing conservation program is the seriousness of agency noise exposure problems. If an agency has minimal noise exposure problems, limited preventive hearing conservation measures may be sufficient. Conversely, an effective hearing conservation program is imperative where severe noise exposure exists.
- Hearing conservation efforts as reported by an agency headquarters may differ from the actual conduct of the program. Program activities may be either more or less comprehensive than those described in the agency submittal.
- A similar qualification must be made between agency policy statements and directives and the degree to which this policy is implemented and enforced.
- In only a few instances was data provided on either the incidence of noise-induced hearing loss or the number of hearing disability claims filed. This information, reported in terms of increases or decreases over time, is an essential indicator of the effectiveness of a hearing conservation program.
- The lack of national requirements for the conduct of a hearing conservation program appears to result in highly variable practices among agencies and installations.
- In general, the costs of hearing conservation activities were either not reported or are not available, since they are included as part of the costs of overall employee health services programs.

Table 5-1 presents a categorization of reported Federal hearing conservation activities indicating the relative agency levels of involvement in such efforts. Although this table covers each of the 38 agencies from which information was requested, several agencies submitted individual responses for their organizational subcomponents rather than a comprehensive statement covering the entire agency. Therefore, all organizational elements in agencies adopting this approach may not be represented either because they do not conduct hearing conservation activities or because the applicable agency headquarters did not obtain information from all the bureaus, services, or administrations under its jurisdiction. Thus, as indicated in Table 5-1, where one organization element may have instituted limited preventive measures, others within the same agency may have established formal hearing conservation programs in response to differing noise exposure problems.

Noteworthy Characteristics of Agency Programs

Even in the absence of statutory requirements specifying components and procedures for the conduct of a hearing conservation program, many Federal agencies appear to have devoted considerable effort to the development and implementation of comprehensive programs that incorporate innovative techniques and that are based on the best scientific information available. Significant policies and practices of specific agency programs having implications for improving the effectiveness of hearing conservation programs are deliniated in the following paragraphs by functional areas. These examples are not inclusive, are extracted from the department-level program descriptions submitted to EPA by various agencies and are treated in greater detail under the applicable agency program descriptions contained in Appendix C.

Extent of Administrative Direction

The degree of guidance provided to operating units or field installations responsible for the actual implementation of hearing conservation programs varies widely among Federal agencies.

- Information from the Department of the Army suggests that extensive administration is provided by references to various aspects of a comprehensive hearing conservation program in over 50 Department of the Army regulations, circulats, technical bulletins, etc.
- The basic Air Force regulation on hazardous noise exposure includes information on the scientific basis for hearing conservation program requirements, provides indepth specifications and procedures covering all phases of program conduct, and incorporates such elements as detailed provisions governing the medical and administrative disposition of personnel who demonstrate hearing loss.

TABLE 5-1
FEDERAL AGENCY LEVELS OF INVOLVEMENT IN HEARING CONSERVATION ACTIVITIES

AGENCY/COMPONENT	*No Hearing Conservation Measures Reported*	*Limited Preventive Measures Instituted*	*Formal Hearing Conservation Program*
Department of Agriculture (USDA)			
Forest Service			X
Department of Commerce (DOC)			
Department Headquarters			X
National Bureau of Standards (NBS)			X
National Oceanic and Atmospheric Administration (NOAA)			X
National Technical Information Service (NTIS)			X
Patent Office		X	
Social and Economic Statistics Administration (SESA)			X
Department of Defense (DOD)			
Department of the Air Force			X
Department of the Army			X
Department of the Navy			X
Deaprtment of Health, Education, and Welfare (HEW)			
Alcohol, Drug Abuse, and Mental Health Administration	X		
Food and Drug Administration (FDA)		X	
Health Resources Administration	X		
Health Services Administration	X		
National Institutes of Health (NIH)			X
National Institute for Occupational Safety and Health (NIOSH)		X	
Social Security Administration (SSA)			X
Department of Housing and Urban Development (HUD)	X		
Department of the Interior (DOI)			
Alaska Power Administration (APA)		X	
Bonneville Power Administration (BPA)			

TABLE 5-1 (Cont'd.)
FEDERAL AGENCY LEVELS OF INVOLVEMENT IN HEARING CONSERVATION ACTIVITIES

AGENCY/COMPONENT	*No Hearing Conservation Measures Reported*	*Limited Preventive Measures Instituted*	*Formal Hearing Conservation Program*
Department of the Interior (Cont'd.)			
Bureau of Indian Affairs (BIA)		X	
Bureau of Land Management (BLM)			X
Bureau of Mines		X	
Bureau of Reclamation			X
Geological Survey			X
Mining Enforcement and Safety Administration (MESA)			X
National Park Service			X
Department of Justice (DOJ)			
Bureau of Prisons			X
Department of Labor (DOL)			X
Department of State	X		
Department of Transportation (DOT)			
U.S. Coast Guard (USCG)			X
Department of the Treasury			
Bureau of Engraving and Printing			X
Bureau of the Mint			X
U.S. Customs Service		X	
Secret Service		X	
ACTION		X	
Atomic Energy Commission (AEC)			X
Civil Aeronautics Board (CAB)	X		
Civil Service Commission (CSC)		X	
Counsel on Environmental Quality (CEA)	X		
Consumer Product Safety Commission (CPSC)	X		
Environmental Protection Agency (EPA)		X	
Federal Communications Commission (FCC)		X	
Federal Deposit Insurance Corporation (FDIC)		X	
Federal Maritime Commission	X		
Federal Power Commission (FPC)		X	

TABLE 5-1 (Cont'd.)
FEDERAL AGENCY LEVELS OF INVOLVEMENT IN HEARING CONSERVATION ACTIVITIES

AGENCY/COMPONENT	*No Hearing Conservation Measures Reported*	*Limited Preventive Measures Instituted*	*Formal Hearing Conservation Program*
Federal Trade Commission (FPC)	X		
General Accounting Office (GAO)	X		
General Services Administration (GSA)	X		
Government Printing Office (GPO)			X
Interstate Commerce Commission (ICC)	X		
Library of Congress		X	
National Aeronautics and Space Administration (NASA)			X
National Labor Relations Board (NLRB)		X	
National Science Foundation (NSF)		X	
Office of Economic Opportunity (OEO)	X		
Securities and Exchange Commission (SEC)		X	
Selective Service System	X		
Small Business Administration (SBA)	X		
Tennessee Valley Authority (TVA)			X
United States Postal Service		X	
Veterans Administration (VA)			X
TOTAL BY CATEGORY	16	19	27

- While individual components within the Tennessee Valley Authority are given considerable latitude in program implementation, the on-going TVA hearing conservation program has been incorporated as one element in the TVA comprehensive hazard control plan designed to ensure that occupational safety and health becomes an integral part of all operating activities.
- Both TVA and AEC impose hearing conservation requirements on their contractors.

Noise Exposure Standards.

Several Federal agencies have either adopted noise exposure standards or conduct various aspects of their hearing conservation programs on the basis of criteria more stringent than those of the Occupational Safety and Health Administration. These agency standards or program applications are summarized in Table 5-2.

TABLE 5-2

SUMMARY OF FEDERAL AGENCY PROGRAMS UTILIZING NOISE EXPOSURE STANDARDS OR PROGRAM APPLICATIONS MORE STRINGENT THAN OSHA PROVISIONS

Agency/Component	*Description of Noise Exposure Standards or Program Application*[1]
U.S. Department of Agriculture	
• Forest Service	Based on noise evaluation studies, appropriate types of hearing protectors and conditions of use are recommended for Forest Service work situations and equipment identified as noise hazards. Permissible exposure times are stipulated for operation of off-road vehicles. In some instances, hearing protection is recommended where not required by OSHA provisions.
Department of Commerce	
• Agency-wide	(1) Department-wide instructions require operating units to identify and document occupational noise exposure levels of 85 dBA and above, and (2) operating units supplied with NBS hearing conservation program guide and NIOSH recommendations for occupational noise exposure standard as guidance in establishing their hearing conservation program requirements.
• Departmental headquarters-Office of Publications	Draft administrative instruction developed which incorporates NBS provisions.
• National Bureau of Standards	OSHA standard is basis for program; as a precautionary measure, employees subjected to sound levels in the 85-89 dBA range for periods of 4 or more hours per day are included in the audiometric testing program.
• National Oceanic and Atmospheric Administration	Same provisions as NBS.
Department of Defense	
• Army	Standard requires initiation of hearing conservation measures for exposure to steady noise levels above 85 dBA *regardless* of duration of exposure.

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[1] Only those aspects of standards (e.g. 8-hour exposure limit, time/intensity trading ratio, steady state noise ceiling, and/or impulse noise limit) which differ from OSHA requirements are specified.

TABLE 5-2 (Cont'd.)
SUMMARY OF FEDERAL AGENCY PROGRAMS UTILIZING NOISE EXPOSURE STANDARDS OR PROGRAM APPLICATIONS MORE STRINGENT THAN OSHA PROVISIONS

Agency/Component	*Description of Noise Exposure Standards or Program Application*[1]
• Air Force	Standard, based on avoidance of damage to hearing organs, establishes 84 dBA limit for 8 hour exposure with a 4 dB time/intensity trading ratio and ceiling of 115 dBA for exposure without adequate ear protection. Noise exposure limits based on maintenance of effective performance and avoidance of damage or undesired responses of the whole human body are also stipulated.
Department of Health, Education, and Welfare	
• National Institutes of Health • Social Security Administration	Program based on damage-risk criterion for continuous noise of 85 decibels. Operating and shop areas in which noise levels are at or about 85 dBA are identified and surveillance records maintained.
Department of the Interior	
• Bonneville Power Administration	Program based on OSHA standards; however, corrective measures have been taken to reduce noise levels between 80 and 87 dB found in printing shops and in computer centers.
• Bureau of Reclamation	Use 90 dBA limit for 8-hour exposure; however, a 3 dB time/intensity trading ratio and a 5 dBA reduction in levels if pure tones are noticeable are used. Impulse noise criterion is 130 dB peak sound pressure level. Engineering controls, if feasible, are to be applied to all locations exceeding 85 dBA. If such controls are not practicable, personal protective equipment is to used in such areas.
• Geological Survey	An objective of the hearing conservation program is to establish hearing baseline data for all employees exposed to levels above 85 dBA. OSHA standards are followed with the inclusion of a 5 dBA reduction in steady noise levels if pure tones are noticeable and a requirement that impulse noise is not to exceed 130 dB peak sound pressure level.

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[1] Only those aspects of standards (e.g. 8-hour exposure limit, time/intensity trading ratio, steady state noise ceiling, and/or impulse noise limit) which differ from OSHA requirements are specified.

TABLE 5-2 (Cont'd.)

SUMMARY OF FEDERAL AGENCY PROGRAMS UTILIZING NOISE EXPOSURE STANDARDS OR PROGRAM APPLICATIONS MORE STRINGENT THAN OSHA PROVISIONS

Agency/Component	*Description of Noise Exposure Standards or Program Application*[1]
Department of Transportation • U.S. Coast Guard	Use Maximum Permissible Daily Exposures (MPDE's) for various categories of hearing hazard environments calculated on the basis of noise surveys and damage risk criteria for impulse and continuous (90 dBA) noise. OSHA standard used for industrial operations.
Environmental Protection Agency	Efforts underway for adoption of 85 dBA limit for 8 hour exposure with a 3 dB time/intensity trading ratio; presently noise surveys include identification of areas above 85 dBA, and a mandatory audiometric testing program will be established for any employee exposed to levels of 85 dBA and above for significant periods.
National Aeronautics and Space Administration • Jet Propulsion Laboratory	Program based on 85 dBA noise limit for 8 hours; hearing protection is required at noise levels above 85 dBA.
Postal Service	Overall objective is to provide employee work environment that does not exceed 85 dBA; ear protective devices are made available to employees exposed to sound levels exceeding 85 dBA, and their use is mandatory when levels exceed 90 dBA.
Veterans Administration	Hearing conservation program to be instituted in all cases where exposure exceeds 85 dBA for 8 hours.

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[1] Only those aspects of standards (e.g. 8-hour exposure limit, time/intensity trading ratio, steady state noise ceiling, and/or impulse noise limit) which differ from OSHA requirements are specified.

Noise Surveys

The manner in which noise surveys are conducted at various Federal installations are noteworthy with respect to quantity and frequency of surveys, use of sophisticated equipment and trained personnel, and utilization and analysis of data obtained from the surveys.

- Since 1968, over 5000 sound level or octaveband analysis readings have been made at Bureau of Reclamation operations.
- Semiannually, the National Bureau of Standards conducts noise surveys with calibrated instruments, which supplement monthly walk-through inspections of National Technical Information Service facilities.
- Noise surveys, conducted by trained personnel and including octave band analysis and consideration of exposure time, are part of every facility inspection performed annually at all Department of Labor organizations and facilities.
- The Bureau of Land Management under the Department of the Interior and the Navy are among those agencies placing significant emphasis on the use of properly trained personnel to conduct noise surveys.
- The Air Force uses sophisticated acoustic noise evaluations as the basis for the establishment of specific area or operator exposure limits.
- TVA has attempted to estimate employee noise exposure for various occupational categories partially on the basis of area noise surveys.
- NASA, Army, and the National Institutes of Health all provide expert services to operating units which include recommendations for engineering and administrative practices to correct deficiencies observed in the course of periodic noise surveys.
- The Bureau of Land Management requires the retention of noise survey records for the purpose of review and analysis.
- Information obtained from Army periodic noise surveys is entered in a computerized noise data bank to provide profiles of noise sources and to assist in the identification of remedial measures.

Engineering Controls

Noteable practices in this area include selective purchasing of equipment, inclusion of noise specifications for purchasing new equipment, and reduction of noise at the source.

- Both the National Bureau of Standards and the Social and Economic Statistics Administration under the Department of Commerce reported that noise emissions were considered in purchasing equipment.
- The Army has developed noise limits for army material which are consistent with department hearing conservation criteria.
- TVA's hazard control plan provides for the development of noise emission specifications for new equipment as well as the incorporation of noise control techniques in the design of new systems and plants.

- The Federal Communications Commission, TVA, AEC, and Geological Survey have all initiated significant engineering control measures designed to reduce noise exposure problems.

Audiometry

Audiometric policies and procedures deserving mention relate to the extent of employees covered in audiometric testing programs, required training of personnel performing audiometry, and evaluation and retention of audiograms.

1. *Employees Covered*
    - TVA requires pre-employment and periodic audiometric testing for all employees.
    - The National Science Foundation includes audiometric testing as part of periodic employee physical examinations.
    - The Bureau of the Mint provides audiometric testing for all new employees.
    - Personnel who routinely enter areas where 84 dBA is exceeded are included in the Air Force monitoring audiometry program.
    - NASA gives audiometric examinations to all persons significantly exposed to noise, and at most installations audiometric testing is given routinely to all employees covered in periodic physical examination programs.
2. *Training for Personnel Performing Audiometry*
    - The Navy reports its training goes beyond recognized professional societies' requirements.
    - The Bureau of Land Management requires that the services of a "recognized audiologist" be obtained to administer tests and to review audiograms.
    - Each regional office of the Bureau of Reclamation has a certified technician to conduct audiometric examinations and has contracted for the services of an audiologist or otologist as a hearing conservation consultant.
3. *Evaluation and Retention of Audiograms*
    - TVA records percent binaural hearing impairment on employees' medical records and since 1967, on computer tape.
    - The Army, in addition to its study of the prevalence of hearing loss in the Army, has initiated a study for the establishment of a Hearing Conservation Data Registry for the storage and analysis of audiometric evaluations.

Educational Programs

- TVA, NASA, the Bureau of Reclamation, and all three DOD military departments reported health education programs on hearing conservation.
- The Army has developed a variety of audio-visual materials on various aspects of hearing conservation, and conducts an annual course for personnel responsible for the implementation of hearing conservation programs.

- The Navy has an extensive educational program for all new personnel, and initial training received is re-inforced at every opportunity.
- The Air Force provides initial and followup indoctrination designed to instill self-discipline for individual protection whenever and wherever hazardous noise in encountered.

Use of Hearing Protection Devices

- In view of the difficulties created by employee attitudes toward wearing ear protectors, the Division of Power Production of TVA and the Office of Publications within the Department of Commerce both provide for the use of disciplinary action for employee non-compliance.
- The military departments and the Coast Guard are among those placing emphasis on the careful sizing and fitting of hearing protectors by trained personnel in order to insure optimal use of the devices.

Recordkeeping Procedures

- The Air Force maintains medical, environmental, and administrative records in a centralized location for each employee and workplace where potentially hazardous noise exposure may occur to facilitate the evaluation of program progress.
- Army technical bulletin TB MED 251 outlines specific recordkeeping procedures for hearing conservation programs.

Qualifications and Training of Program Personnel.

TVA, the Army, and the Air Force all reported the involvement of highly specialized personnel in their hearing conservation activities.

- TVA has recently established a multidisciplinary, interdivisional noise control engineering team to develop processes and techniques to alleviate noise exposure problems.
- The Army's hearing conservation program is supported by military audiologists, occupational medicine officers, safety engineers, otolaryngologists, occupational health nurses, industrial hygienists, sanitary engineers, and environmental science officers.
- The Air Force program is supported by more than 60 otolaryngologists and audiologists, directed by more than 130 Bioenvironmental Engineers at the installation level, and supplemented by a pool of 342 technicians who have received accredited training in hearing conservation.

Utilization of Specialized Facilities

Several Federal agencies have supplemented their own in-house capabilities with expert services in conducting their hearing conservation activities.

- The Bureau of Prisons and the Bureau of the Mint are among those organizations which have availed themselves of the National Institute of Occupational Safety and Health extensive facilities, laboratories and expertise.
- Both the Bureau of Engraving and Printing and the Smithsonian have received assistance from the Public Health Service in conducting their programs.
- The Air Force innovative hearing conservation program was developed in conjunction with the Committee on Hearing, Bioacoustics and Biomechanics (CHABA) of the National Academy of Science.

Reported Problems

Although the activities and operations of Federal agencies vary widely, noise exposure problems resulting from certain common sources were reported with some frequency. These include noise from printing equipment and operations, computer operations, industrial machinery and tools (e.g. woodworking, metalworking), power plants, construction and grounds maintenance equipment, mobile vehicles, ordnance, and aircraft operations.

Problems which limit the effectiveness of hearing conservation efforts were cited by the following agencies:

- Both the Bureau of Prisons and the National Institutes of Health reported that employee attitudes towards ear protectors, either forgetting or refusing to wear them, was a major problem.
- Funding constraints were reported by TVA and the Bureau of Land Management, National Park Service, and Bureau of Reclamation all under the Department of Interior. The high cost of audiologist services, and the need for and availability of both trained personnel and monitoring equipment (directly related to funding limitations) were mentioned.
- Both TVA and GPO stated that the unavailability of feasible noise control technology hampered their efforts. GPO pointed out that printing plant machinery which utilizes the latest state of the art noise suppression equipment is not available from U.S. manufacturers from whom Federal agencies are required to purchase such equipment.

NOISE ABATEMENT PROGRAMS

This discussion summarizes Federal agency noise abatement programs that, as used in this report, encompass the following types of activities:

- Measures initiated to control noise generated by agency facilities and operations, primarily for reducing noise impacts on surrounding communities. This type of noise has been variously described as over-the-fence noise, environmental noise, spill-over noise, or property line noise.
- Efforts designed to reduce nonhazardous noise levels at Federal installations, for the improvement of working environments.

- Use of noise control techniques (e.g., inclusion of noise emission limits in specifications and regulations) that are applicable not only to agency operations but to activities falling under that agency's jurisdiction. Examples of this type of activity would be the General Services Administration procurement specifications for Government equipment or the Department of Housing and Urban Development inclusion of noise criteria applicable to HUD assisted developments.

The primary category of Federal noise abatement programs involve those projects designed to reduce over-the-fence noise. Many agencies have, in the past, initiated such projects to minimize citizen complaints about their activities or to improve community-facility relations. Executive Order 11752, "Prevention, Control, and Abatement of Environmental Pollution at Federal Facilities", which was signed by the President on December 17, 1973, has given a significant impetus to Federal noise abatement actions. E. O. 11752 directs the heads of Federal agencies to ensure that all facilities under their jurisdiction are designed, constructed, managed, operated, and maintained so as to conform to Federal noise emission standards for products adopted in accordance with provisions of the Noise Control Act of 1972 and State, interstate, and local standards for control and abatement of environmental noise. The provisions and implementation of E. O. 11752 are discussed under Section 3 of this report.

The information on Federal noise abatement activities for this report compiled from official agency submittals and supplemented in some cases by the following two sources of information:

1. On April 1, 1974 EPA requested that various Federal agencies provide an indication of their current and anticipated environmental noise problems to facilitate EPA development of guidelines to assist Federal agencies in carrying out their responsibilities under E. O. 11752. This request was directed to all eleven Federal departments as well as AEC, CAB, FCC, FPC, GSA, NASA, NSF, TVA, Postal Service, and VA. Relevant portions of responses to this request have been incorporated into the description of the applicable agency noise abatement programs.
2. In conjunction with E. O. 11752, the Office of Management and Budget directed Federal agencies to submit reports to EPA by August 1, 1974 on their on-going and planned pollution abatement projects, including projects to abate over-the-gence noise from their installations. The Department of the Navy submitted program descriptions and fiscal data on 36 noise abatement projects, 21 of which require FY76 funding, and the Air Force submitted data on one FY76 project. This information has been incorporated into the descriptions of the Navy and Air Force noise abatement programs.

Federal agencies reporting no noise abatement activities were:

Department of Agriculture
Department of Justice
Department of Labor
ACTION
Civil Aeronautics Board
Consumer Product Safety Commission
Council of Environmental Quality
Environmental Protection Agency
Federal Communications Commission
Federal Maritime Commission
Federal Power Commission
Federal Trade Commission
General Accounting Office
Government Printing Office
Interstate Commerce Commission
Library of Congress
National Labor Relations Board
National Science Foundation
Office of Economic Opportunity
Securities and Exchange Commission
Small Business Administration

A brief summary of noise abatement activities and associated funding for those agencies or agency organizational subcomponents that reported programs is provided in Table 5-3. As indicated in this table, agency noise abatement programs vary widely, primarily in response to differing noise problems, in both the nature of activities conducted and the magnitude or scope of the program.

Another summary perspective of reported funding for Federal agency noise abatement programs is contained in Table 5-4. In both Tables 5-3 and 5-4, fiscal data, when available, has been rounded off to the nearest thousand dollars. Funding information is not strictly comparable among the various agencies due to variations in the fiscal years covered, cost accountability, and in some instances, inadequate identification in the agency submittal of what the figures actually represent.

In addition, the figures shown do not reflect the total resources allocated for Federal noise abatement efforts, since several agencies did not submit fiscal data on reported

TABLE 5-3
SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT PROGRAMS

AGENCY/COMPONENT	*PROGRAM AREAS AND FUNDING*
DEPARTMENT OF COMMERCE	
• National Technical Information Service	Installation of acoustical barriers in general office areas to reduce employee annoyance.
• National Bureau of Standards	Responsible for implementation of the Experimental Technological Incentives Program (ETIP). Two ongoing ETIP projects, the power lawn mower and air conditioner procurement experiments, incorporate noise considerations.
DEPARTMENT OF DEFENSE	
• Army	U.S. Army Environmental Hygiene Agency conducts environmental noise pollution assessments of existing operations and programmed military movements and activities and provides recommendations on corrective abatement measures. Projects include AICUZ[1] implementation, use of acoustic materials in building construction, determination of baseline noise levels for military vehicles, and modification of aircraft and regulation of operating procedures. Funding: FY74 - $1,200K; FY75 - $2,570K; FY76 - $2,000K(est.); FY77 - $3,000K (est.); FY78 - $2,000K (est.)
• Navy	AICUZ[1] implementation including acquisition of restrictive easements and program development; abatement of specific noise problems through engineering controls at identified facilities; various studies to develop engineering control methods, design plans and specifications for sound suppression systems and facilities with Navy-wide applications. Funding: FY73 - $352K; FY74 - $1,913K; FY75 - $1,760K; FY76 - $23,960K; FY77 - $32,400K; Post-FY77 - $527,500K. (These figures do not include all noise abatement projects funded at less than $50,000.)

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[1] Air Installation Compatible Use Zones Program which (i) is designed to ensure that the use of privately owned land near military airports is compatible with both protection of the public and mission accomplishment and (ii) provides for noise source control measures, cooperation with local governing bodies, and purchase of restrictive easements over land.

TABLE 5-3 (Cont'd.)
SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT PROGRAMS

AGENCY/COMPONENT	*PROGRAM AREAS AND FUNDING*
DEPARTMENT OF DEFENSE (Cont'd)	
• Air Force	Large program for acquisition of sound suppressors for maintenance runup operations; AICUZ[1] implementation. Funding: FY68-72 - $23,143K; FY73 - $5,400K; FY74 - $3,600K; FY75 - $4,000K; FY76 - $4,081K; FY77 - $4,000K. The Air Force only submitted fiscal data covering the program for acquisition of sound suppressors for maintenance runup operations and one project to reduce "over-the-fence" noise estimated at $81,000 in FY 76. Unlike the Navy, AICUZ[1] program funds were *not* reported.
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE	
• Food and Drug Administration	Corrective measures to reduce noise from FDA Data Processing Units. Funding: FY72 - $2K; FY73 - $17K; FY74 - $6K.
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT	Foster noise responsive land use patterns by regulating HUD assisted developments and dissemination of HUD noise standards information and guidelines. Manpower costs for implementation of HUD noise abatement policy: $150K - $200K per fiscal year.
DEPARTMENT OF THE INTERIOR	
• Bonneville Power Administration	Consideration of noise in design of BPA facilities and selection of sites to reduce both over-the-fence and workplace noise; issuance of standard specification for noise control in construction projects. Funding: Currently $2,500K per fiscal year.
• Bureau of Reclamation	Noise abatement incorporated in layout and design of new facilities as a standard practice.

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[1] Air Installation Compatible Use Zones Program which (i) is designed to ensure that the use of privately owned land near military airports is compatible with both protection of the public and mission accomplishment and (ii) provides for noise source control measures, cooperation with local governing bodies, and purchase of restrictive easements over land.

TABLE 5-3 (Cont'd.)

SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT PROGRAMS

AGENCY/COMPONENT	*PROGRAM AREAS AND FUNDING*
DEPARTMENT OF STATE	Minimal program designed to identify potential noise problem areas.
DEPARTMENT OF TRANSPORTATION	
• U.S. Coast Guard	Reduction of noise associated with operation of fog signalling equipment; noise abatement incorporated in design and maintenance of USCG vessels. Funding: FY73 - $183K; FY74 - $115K; FY75 - $50K.
• Urban Mass Transportation Administration	Preparation of a Rapid Transit Noise Abatement Handbook
DEPARTMENT OF THE TREASURY	
• Bureau of the Mint	Series of community noise surveys in environs of Philadelphia Mint.
• Consolidated Federal Law Enforcement Training Center	Erection of board fence to deflect noise from gunfire at training area.
• U.S. Customs Service	Efforts to resolve specific noise problem at border crossing.
• Internal Revenue Service	Indirect consideration of noise in equipment selection and installation.
AUTOMIC ENERGY COMMISSION	Eleven noise abatement engineering projects to improve working environments and comply with OSHA standards (total funding of $809K over several years); noise monitoring and surveillance. Funding: FY73 - $110K; FY74 - $130K; FY75 - $240K.
CIVIL SERVICE COMMISSION	Installation of acoustical shields on noise-producing equipment; periodic noise monitoring of selected sites.
FEDERAL DEPOSIT INSURANCE CORPORATION	Installation of sound-proofing in a few cases.
GENERAL SERVICES ADMINISTRATION	Inclusion of noise controls or limits in GSA specifications and regulations.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	
• Ames Research Center	Construction of sound absorbing structure around wind tunel. Funding: FY73 - $495K.

TABLE 5-3 (Cont'd.)

SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT PROGRAMS

AGENCY/COMPONENT	*PROGRAM AREAS AND FUNDING*
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (Cont'd.)	
• Marchall Space Flight Center	Studies and analyses of noise imposed upon surrounding communities by rocket test facilities and launch sites. Funding: FY72 - $50K; FY73 - $75K; FY74 - $470K; FY75 - $455K.
SELECTIVE SERVICE SYSTEM	Acoustic conditioning an integral part of all alteration and renovation planning. Funding: FY73 - $21K (represents corrective measures at computer center only)
TENNESSEE VALLEY AUTHORITY	Conducts noise abatement surveillance, special studies, complaint investigation, environmental monitoring, and noise control engineering in the design of new plants. Funding: FY72 - $10K; FY73 - $24K; FY74 - $38K; FY75 - $50K.
U.S. POSTAL SERVICE	Contracted project to develop systems and equipment modification to reduce noise levels of existing equipment ($210K over several years); noise limits included in contract specifications for new equipment. Funding: FY74 - $150K (reflects in-house effort only), future contracts estimated at $50K per year.
VETERANS ADMINISTRATION	Consideration of noise in equipment procurement and preparation of environmental impact statements.

TABLE 5-4
SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT FUNDING

AGENCY/COMPONENT	*FUNDING ($ IN THOUSANDS)*[1]				
	PRIOR YEARS	*FY74*	*FY75*	*FUTURE YEARS*	*TOTAL*
DEPARTMENT OF DEFENSE					
• Army	Not Reported	1,200	2,570	7,000 (FY76-78)	10,770
• Navy	352[2] (FY73)	1,913[2]	1,760[2]	583,860[2]	587,885[2]
• Army	28,543[3] (FY68-73)	3,600[3]	4,000[3]	8,081[3] (FY76-77)	44,224
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE					
• Food & Drug Administration	19 (FY72-73)	6			25
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT	150-200[4] per fiscal year	150-200[4]	150-200[4]	Not Reported	450-600[4] (for 3 fiscal yrs.)
DEPARTMENT OF THE INTERIOR	-				
• Bonneville Power Admin	Not Reported	2,500	2,500	Not Reported	5,000 (for 2 fiscal yrs.)
DEPARTMENT OF TRANSPORTATION					
• U.S. Coast Guard	183 (FY73)	115	50	Not Reported	348
ATOMIC ENERGY COMMISSION	110 (FY73)	130	240	Not Reported	480
SUB-TOTAL		9,614-9,664	11,270-11,320	—	—

[1] Reported fiscal data is not always strictly comparable among agencies due to variations in fiscal years covered, cost accountability, and in some cases, inadequate agency identification of what figures represent.

[2] Does not include some noise abatement projects funded at less than $50,000.

[3] Unlike the Navy, does not include funding for the Air Installation Compatible Use Zones (AICUZ) program.

[4] Manpower Costs for implementation of HUD noise abatement policy.

TABLE 5-4 (Cont'd)

SUMMARY OF REPORTED FEDERAL AGENCY NOISE ABATEMENT FUNDING

AGENCY/COMPONENT	*FUNDING ($ IN THOUSANDS)*[1]				
	PRIOR YEARS	*FY74*	*FY75*	*FUTURE YEARS*	*TOTAL*
SUB-TOTAL CARRIER FORWARD		9,614-9,664	11,270-11,320		
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION					
• AMES Research Center	495 (FY73)				495
• Marshall Space Flight Center	125 (FY72-73)	470	455	Not Reported	1,050
SELECTIVE SERVICE SYSTEM	21[2]				21[2]
TENNESSEE VALLEY AUTHORITY	34 (FY72-73)	38	50	Not Reported	122
U.S. POSTAL SERVICE	Not Separable[3]	150[3]	Not Separable[3]	Not Separable[3]	150[3]
TOTAL		10,272-10,322	11,775-11,825		

[1] Reported fiscal data is not always strictly comparable among agencies due to variations in fiscal years covered, cost accountability, and in some cases, inadequate agency identification of what figures represent.

[2] Represents corrective measures at computer center only.

[3] Reflects in-house effort only, on-going contracted effort funded at $210K over several years with future contracts estimated at 50K per year.

programs. However, the FY74 total of over $10 million and FY75 funding that approaches $12 million may be considered as lower bounds of Federal funding for noise abatement efforts.

The fiscal data reported also provides another indication of the wide divergence among agency noise abatement programs. Expenditures range from the Air Force FY75 funding of $4 million, which does not include Air Installation Compatible Use Zones (AICUZ) implementation costs, and the Navy FY76 budget of $23.96 million and estimated post-FY77 requirements of $527.5 million to substantially smaller efforts on the order of $25,000 over a 3-year period or $21,000 covering engineering measures to correct a specific noise problem.

Detailed descriptions of reported Federal agency noise abatement programs are provided in Appendix C.

TECHNICAL ASSISTANCE

Federal agency technical assistance programs, as used here, encompass Federal guidance and advice to state and local governments in the area of noise abatement and control. Technical assistance includes such activities as model legislation, training programs, information services, and guidance in the selection and use of noise instrumentation and monitoring systems. Similar Federal assistance directed to the industrial and private sectors is not included, nor is that assistance provided by one Federal agency to another.

The information collected by EPA for this report was not sufficient to allow an in-depth treatment of technical assistance programs. Although the guidelines provided by EPA to the Federal agencies (shown as Appendix A) for submitting data did not explicitly identify technical assistance programs, agencies were requested to submit general policy and program information that would adequately characterize agency noise control activities. The level of detail and type of information provided was somewhat variable, with the EPA program receiving greater coverage than those of other agencies. Table 5-5 summarizes reported technical assistance activities and associated funding by individual agency. Detailed descriptions of Federal technical assistance programs are provided in Appendix C.

As seen from Table 5-5, Federal technical assistance programs are designed to serve one or both of the following functions:

- To encourage state and local action in noise control.
- To facilitate state and local participation in implementation of Federal regulations and programs.

TABLE 5-5
FEDERAL TECHNICAL ASSISTANCE PROGRAMS

AGENCY/COMPONENT	*SUMMARY OF TECHNICAL ASSISTANCE ACTIVITIES*	*FUNDING ($ IN THOUSANDS)*	
		FY 74	*OTHER YEARS*
Department of Defense	Successful implementation of AICUZ program requires sustained consultation and assistance of State and local tovernments	Not reported	Not reported
Department of Health, Education and Welfare			
• National Institute for Occupational Safety and Health	Conducts short training courses and disseminates educational materials on occupational health problems – noise included as prominant topic	Not separable	Not separable
Department of Housing and Urban Development	Provides funds to state and local governments for noise-related planning studies; develops and disseminates noise information and guidance materials	9[1]	59 for FY71-73[1]
Department of Transportation			
• Office of Noise Abatement	Conducted series of training courses on highway noise control regulations; provided noise instrumentation	None in 74[2]	450 in FY73[2]

[1] Represents funding for "Handbook on Community Environmental Noise" only
[2] Funds shown are estimates submitted to EPA in beginning FY75

TABLE 5-5 (Cont'd)
FEDERAL TECHNICAL ASSISTANCE PROGRAMS

AGENCY/COMPONENT	*SUMMARY OF TECHNICAL ASSISTANCE ACTIVITIES*	*FUNDING ($ IN THOUSANDS)*	
		FY	*OTHER YEARS*
Department of Transportation (Cont'd)			
• Federal Highway Administration	Conducted series of training courses in highway design for noise control; outfitted a mobile training van	Not separable for 74	150 for 73-75
Environmental Protection Agency	Comprehensive program involving advice to state and local governments on: a) legislation development and implementation b) manpower assessment and education c) instrumentation and monitoring systems d) program identification and assessment	934.7	48.6 in 73 936.9 in 75

---

[1] Represents funding for "Handbook on Community Environmental Noise" only

[2] Funds shown are estimates submitted to EPA in beginning FY 75

The first type, which is usually instituted in response to a legislative directive, has as its goal the development of appropriate state and local noise control programs that complement those at the Federal level. The second may provide an incentive for state and local participation needed to assure successful implementation of Federal policies.

The programs reported in the first category are the technical assistance activities of EPA in the non-occupational noise area and of the HEW National Institute for Occupational Safety and Health in occupational noise.

Technical assistance programs in the second category were reported by the Department of Housing and Urban Development (HUD), the Department of Transportation (DOT), and EPA. Although not specifically reported, the DOD AICUZ program, which is discussed under noise abatement programs, also involves some technical assistance activities. Implementation by DOL of the provisions of the Occupational Safety and Health Act requires technical assistance efforts. However, DOL did not provide information on these activities.

SECTION 6

RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAMS

RESEARCH AUTHORIZATIONS IN THE NCA

The Noise Control Act (NCA) of 1972 (PL 92-574) charges EPA with the principal responsibility for implementing the policy of the Act. Section 2 of the Act. states the policy intended by Congress and identifies coordination of Federal noise research as a primary means for implementation:

> "The Congress declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To that end, it is the purpose of this Act to establish a means for effective coordination of Federal research and activities in noise control. . ."

The specific authorization for EPA to establish interagency noise research coordination is in Section 4 (c) (1) Act, which reads:

> "The Administrator shall coordinate the programs of all Federal agencies relating to noise research and noise control. Each Federal agency shall, upon request, furnish to the Administrator such information as he may reasonably require to determine the nature, scope, and results of the noise-research and noise-control programs of the agency."

EPA envisions that such research coordination can provide a mechanism to aid in fulfilling its responsibilities under Section 4 (c) (3) of the Act, which reads:

> "On the basis of regular consultation with appropriate Federal agencies, the Administrator shall compile and publish, from time to time, a report on the status and progress of Federal activities relating to noise-research and noise-control. This report shall describe the noise control programs of each Federal agency and assess the contributions of those programs to the Federal Government's overall efforts to control noise."

Research coordination is also the basis upon which EPA will establish the need for conducting its own research programs. These programs should fulfill needs that are not being met through ongoing or planned programs in other Federal agencies. Section 14 of the Act reads, in part:

> "in furtherance of his responsibilities under this Act and to complement, as necessary, the noise-research programs of other Federal agencies, the Administrator is authorized to:

(1) Conduct research, and finance research by contract with any person, on the effects, measurements, and control of noise, including but not limited to, . ."

FEDERAL NOISE RESEARCH COORDINATION

It is clear from Section 14, the legislative history of the NCA, and the extent of the funds* assigned for implementing the Act that Congress intends for EPA to utilize much of the research and technology generated by other Federal agencies to fulfill the provisions of the Act. Therefore, Federal noise research coordination is viewed as a major resource whereby EPA will achieve much of its research, development, and demonstration requirements to support the regulatory and enforcement activities of the Agency.

Accordingly, EPA developed a plan to effectively coordinate Federally sponsored noise research, development, and demonstration activities. The plan utilizes three interacting bodies to affect interagency coordination.

1. An ad-hoc interagency noise research committee composed of high level representatives of agencies with major noise research programs.
2. Noise research panels for aircraft, surface vehicles, stationary machinery, and noise effects.
3. Ad-hoc working groups to address specific problem areas.

These tools were selected to assure EPA a continuing interface with other agencies regarding noise RD&D programs and projects, technological and scientific level expertise, and middle management and policy processes.

Early in 1974, EPA initiated Federal noise research coordination by holding a meeting of the Interagency Noise Research Committee. This meeting was held to review and discuss the proposed coordination plan and to invite the agencies to designate representatives of their scientific and technical management staff concerned with noise RD&D to serve as members on the four noise research panels. The agencies represented on the panels are shown in Table 6-1.

In addition to exchange of information, the general functions of the panels in their respective areas are:

- Review and assessment of the current state of technology
- Review and assessment of the status of research and technology development

*FY73 - $3,000,000
FY74 - $6,000,000
FY75 - $12,000,000

TABLE 6-1
STRUCTURE OF RESEARCH PANELS

Noise Research Panel	*Agency Membership*
Aircraft	NASA, DOT, DOD, HUD, DOC, EPA
Surface Vehicles*	DOT, HUD, DOD, DOC/NBS, EPA
Machinery	HEW/NIOSH, DOI/Bureau of Mines, NSF, DOD, DOC/NBS, DOL, EPA
Noise Effects	HEW, (NINDS, NIOSH, NIEHS), DOT, NSF, HUD, NASA, DOD, DOL, DOC/NBS, DPA

*This panel is also charged with the responsibility for the Federal research supporting land use policies.

- Preparation of recommendations concerning ongoing research activities.
- Recommendation of noise research programs and projects, and methods for their accomplishments.
- Preparation of reports on the status of ongoing noise research activities.
- Receipt and review of pertinent scientific and programmatic advice from other standing bodies.

During the calendar year 1974, the research panel efforts were directed primarily to preparation of reports on the status of ongoing noise research activities (the four panel reports are contained in Appendices D, E, F and G). In-depth analyses of the programs will be initiated to determine the relevancy of the research underway to support near- and far-term EPA goals to reduce environmental noise to acceptable levels and to determine the requirements for additional research efforts. A summary of these reports on Federal noise RD&D is presented in the following sections.

FEDERAL NOISE EFFECTS RESEARCH

There are nine Federal agencies conducting research on noise effects. Figure 6-1 is a summary of the funding, by agency, for the FY73 through FY75. The total funding over this period has increased by 68 percent. This is principally due to the large increase of expenditures by HEW/NINDS and the steady increasing resource allocations by DOD and NASA.

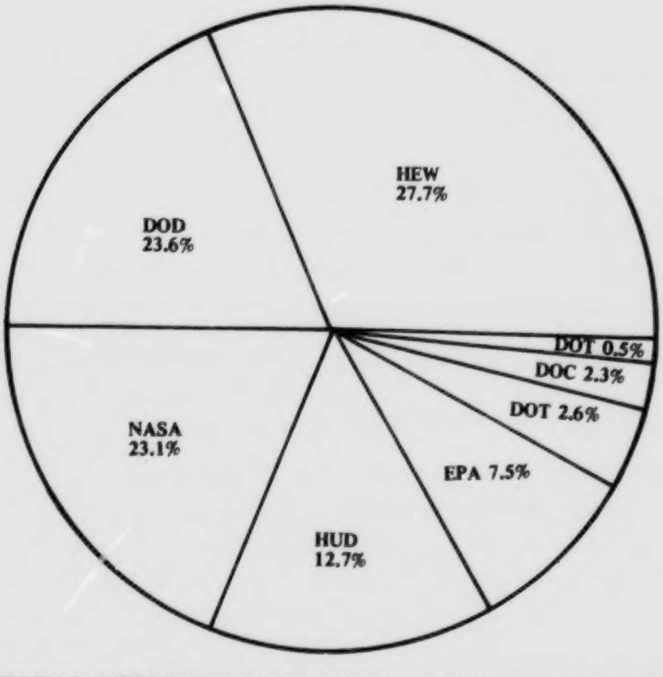
Table 6-2 identifies the noise effects research categories currently being addressed by each of the participating Federal agencies. This table reflects several major points regarding

FIGURE 6-1

NOISE EFFECTS RESEARCH FUNDING BY AGENCY

AGENCY	*FY73*	*FY74*	*FY75**
HEW/NINDS	526	622	1,157
HEW/NIEHS	153	258	239
HEW/NIOSH	395	507	481
DOD	984	1,180	1,190
NASA	1,127	1,154	1,200
DOT	50	130	50
NSF	20	–	–
DOC/NBS	98	117	142
HUD	117	638	460
EPA	24	377	309
DOI/BUMINES	72	23	–
TOTALS	3,566	5,006	5,228

*DOD FY75 Estimated the Same as FY74



TOTAL REPORTED FY74 EXPENDITURES – 5,006,000

TABLE 6-2
CURRENT AGENCY INVOLVEMENT IN RESEARCH CATEGORIES

Agency *Research Category*	*HEW(NINDS)*	*HEW(NIEHS)*	*HEW(NIOSH)*	*DOD*	*NASA*	*DOT*	*DOC(NBS)*	*HUD*	*EPA*	*NSF*	*DOI(BuMines)*
Noise-Induced Hearing Loss	X	X	X	X					X	X	
Non-auditory Health Effects		X	X	X					X		
Individual Behavior Effects			X	X		X	X		X		
Noise Effects on Sleep					X				X		
Communication Interference	X			X					X		X
Community or Collective Response				X	X	X		X			
Domestic Animals and Wildlife											
Measurement Methodology and Calibration			x	x	x			x	x		X

the various agency programs. Within HEW, three separate institutes are involved in noise effects research.

NINDS has major research efforts in the areas of noise-induced hearing loss and communication interference. The NIEHS research is conducted mostly on animals. The major part (83 percent) is directed toward noise-induced hearing loss, and the remainder is allocated to the support of nonauditory health effects research. NIOSH has a major research effort in noise-induced hearing loss, which includes both epidemiological and experimental activities. In addition, NIOSH currently is supporting research on nonauditory health effects and in measurement methodology and calibration.

DOD, like EPA, currently pursues a broad research effort that includes each of the following categories: noise-induced hearing loss, nonauditory health effects, individual behavior effects, communication interference, and measurement methodology and calibration. Efforts are also underway in community and collective response effects by DOD and in sleep effects by EPA.

NASA has a major research effort in community or collective response and, in addition to EPA, is the only agency involved in research on the effects of noise on sleep. HUD also has a major effort in community or collective response and devotes nearly 90 percent of its funds to this area. DOT currently has the smallest active research program in noise effects, but that agency directs all of its support toward community or collective response.

NBS directs all its noise effects research to individual behavior.

At this time, no agency has any on-going research activity on the effects of noise on domestic animals and wildlife.

Table 6-3 is a summary of the funding as a function of noise effects research category for the FY73 through FY75. There has been a steady increase in the funding for noise-induced hearing loss, which, in FY75, received 38 percent of the total effects research resources. A significant increase in funding for the community or collective response category is shown for FY75. Except for the nonauditory health effects category, which shows a decrease in effort for FY75, the funding has remained fairly constant for remaining categories.

FEDERAL AIRCRAFT NOISE RD&D

Federally sponsored aircraft noise RD&D is classified by noise source categories and by categories that have broad applications. Aircraft noise sources being considered in the Federal RD&D include:

- Subsonic conventional takeoff and landing aircraft (CTOL).
- Powered life aircraft including short takeoff and landing aircraft (STOL) and reduced takeoff and landing (RTOL) aircraft.
- Rotorcraft and vertical takeoff and landing aircraft (VTOL),
- Supersonic cruise aircraft.
- General aviation aircraft.

TABLE 6-3
NOISE EFFECTS RESEARCH FUNDING BY CATEGORY

CATEGORY	*FY73*	*FY74*	*FY75**
Noise-Induced Hearing Loss	1,084	1,366	1,979
Non-Auditory Health Effects	126	294	61
Individual Behavior Effects	381	361	443
Noise Effects on Sleep	217	254	159
Communication Interference	275	316	296
Community or Collective Response	410	821	1,114
Domestic Animals and Wildlife	–	–	–
Measurement Methodology and Calibration	1,073	1,594	1,176
TOTALS	3,566	5,006	5,228

*DOD FY75 Estimated the Same as FY74

Table 6-4 summarizes the Federal agency resource allocations for FY73 through FY76 for all aircraft noise RD&D categories.

Funding for basic research and technology programs shows only minor fluctuations in this period. Programs in this category have broad application and apply to all aircraft noise source types. Funds for noise portions of systems studies to define air transportation needs and the means to meet these needs are relatively low. There is a significant increase in funding for general aviation aircraft noise. The projected FY76 funding for general aviation is over ten times the amount of FY73. Noise related programs applied to supersonic cruise aircraft are about the same in FY73 and FY74 and FY75 and FY76. Funding for noise related to powered lift and rotorcraft/VTOL levels off in FY74 and is fairly constant through FY76. Noise programs in the CTOL category apply mostly to the existing commercial aircraft fleet. Funding in this category shows significant decreases in FY74, FY75, and FY76. The major factor in the decreases is the pre-planned completion during this period of two demonstration programs leading to certifiable hardware suitable for retrofit of existing aircraft – the FAA Sound Absorbent Material (SAM) nacelle program and NASA JTSD REFAN program.

Figure 6-2 shows funding by agency for all aircraft noise RD&D categories for the FY73 through FY76. NASA plays the dominant role in all categories of aircraft noise

TABLE 6-4
SUMMARY OF FEDERAL AIRCRAFT NOISE RD&D ACTIVITIES AND RESOURCE ALLOCATIONS

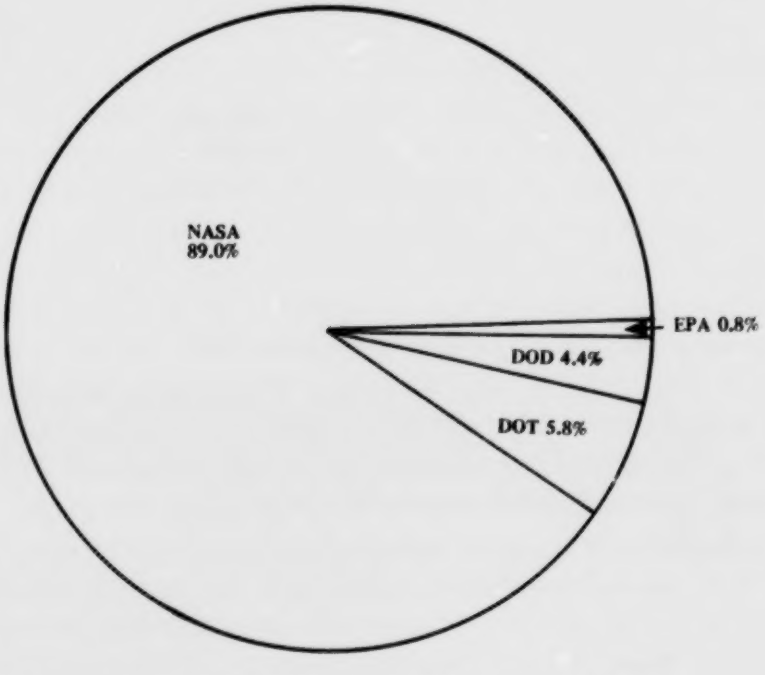
	Fiscal Year Funding ($1,000)				
Technical Area	*Sponsoring Agency*	*1973*	*1974*	*1975*	*1976*
Subsonic Conventional Aircraft	NASA DOT	27,704(1,5) 8,175	25,204 1,899	6,017 900	2,703 –
	Total	35,880	27,103	6,917	2,703
Powered Lift Aircraft	NASA DOT	4,405(1) 241	2,082 –	2,977 –	2,952 –
	Total	4,647	2,082	2,977	2,952
Rotorcraft/VTOL	NASA DOD	–(2) 267	1,774 534	2,284 675	2,294 275
	Total	267	2,308	2,959	2,569
Supersonic Cruise	NASA DOT	2,070(1,3) 316	2,086 299	1,490 100	1,730 –
	Total	2,386	2,385	1,590	1,730
General Aviation	NASA	80(1)	355	448	996
Air Transportation Systems	NASA EPA	255 –(4)	428 404	248 –	227 –
	Total	255	832	248	227
Basic Research and Technology	NASA DOT DOD	10,765(1) 2,830 1,784	14,149 785 1,752	13,840 1,282 793	14,269 1,760 1,112
	Total	15,379	16,686	15,915	17,141
GRAND TOTAL		58,894	51,751	31,054	28,318

1. The NASA funding data included in this table for FY73 are based on information supplied to EPA by NASA in December, 1973. The content of the breakouts by research area is not exactly the same as those for other fiscal years listed.
2. FY73 funding included in Powered Lift Aircraft Noise Technology.
3. Some program activity included here that is listed under Basic Research and Technology for other fiscal years.
4. EPA FY74 total includes some funds committed in FY73.
5. For FY73, $1090K of the funds listed were for subsonic engine and nacelle technology-Quiet Engine I.

FIGURE 6-2

SUMMARY OF FEDERAL AGENCIES RESOURCE ALLOCATIONS FOR AIRCRAFT NOISE RD&D

AGENCY	*Fiscal Year Resources ($1,000)*			
	FY73	*FY74*	*FY75*	*FY76*
NASA	45,280	46,078	27,304	25,171
DOT	11,563	2,983	2,282	1,760
DOD	2,051	2,286	1,468	1,387
EPA	(1)	404	–	–
TOTALS	58,894	51,751	31,054	28,318



TOTAL REPORTED FY74 EXPENDITURES – $51,751,000

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1 EPA FY74 Total includes some funds committed in FY73.

RD&D, especially as total funding drops in FY75 and FY76 with the completion of the REFAN and the retrofit feasibility program of DOT/FAA. The decrease in DOT funding is consistent with the decision by FAA to recommend the SAM retrofit alternative, which limits the necessity for applying major noise RD&D funding to existing commercial fleet noise reduction. Most of the DOT funds in FY75 and FY76 are in the category of basic research and technology and are applicable to technology needs for future aircraft noise regulations. The DOD program shows a steady decrease in resource allocations during the FY73 to FY76.time period. However, most DOD resources are committed to basic research and technology and will also be applicable to support future aircraft noise regulations.

Overall, there has been a steady decline in aircraft noise RD&D expenditures during the period FY74 to FY75, as shown in Table 6-4.

FEDERAL SURFACE VEHICLE NOISE RD&D

The Federal agencies known to sponsor surface vehicle noise RD&D activities are DOT, DOD, EPA, USDA, and NSF. The total funding by these agencies for FY73 through FY75 is provided in Figure 6-3. DOT and DOD allocated the major portion of the Federal resources during this period. However, the total funding peaked in FY74 at $3,374,000.00, and the projected funding by all of the agencies decreased abruptly in FY75. Some of this decrease relates to incomplete reporting of estimated FY75 expenditures and to completion of the expensive portions of major DOT and DOD technology demonstration programs.

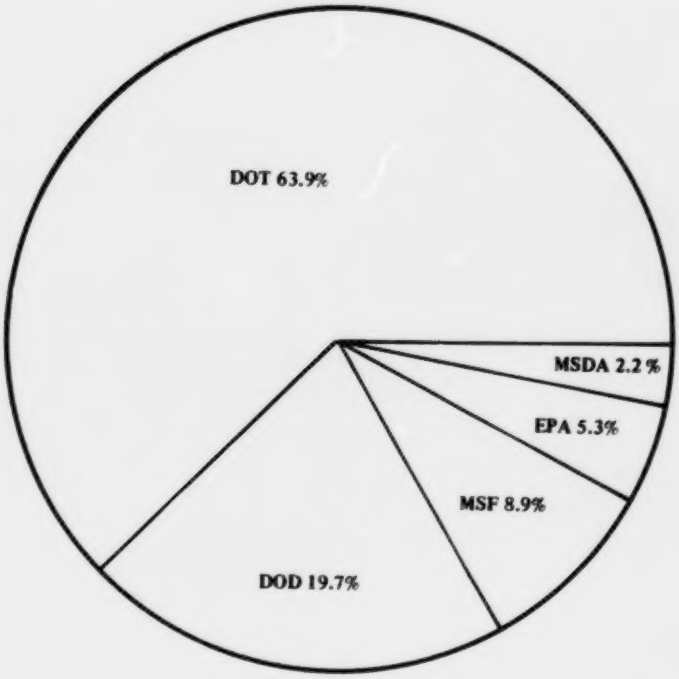
Table 6-5 is a summary of the major surface vehicle noise RD&D programs being sponsored by the Federal agencies. DOT is the principal Federal agency sponsoring surface vehicle noise RD&D. These activities are primarily concerned with transportation systems and are associated with three major programs. Highway Noise Reduction Program, Urban Transportation System Noise Reduction Program, and Conventional Railroad and Intercity High Speed Systems Program. With emphasis on control of highway noise, the major efforts have been concentrated on the control of heavy duty truck and bus noise. Future research efforts emphasize truck tire and engine mechanical and combustion noise.

Although the DOT resource allocations to reduce noise from urban transportation and conventional and high speed railway transportation systems are not specifically identifiable within total development funding, significant noise RD&D efforts are underway in these non-noise dedicated programs. The emphasis is in the development of future mass transportation systems. As such, noise is only one of many factors being considered and is often addressed as a design specification.

FIGURE 6-3

SUMMARY OF FEDERAL EXPENDITURES BY AGENCY FOR SURFACE VEHICLE NOISE RD&D PROGRAMS

AGENCY	*Fiscal Year Funding ($1,000)*		
	1973	*1974*	*1975*
DOT	2,154	2,156	1,135
DOD/ARMY	684	665	160
EPA	369	178	–
NSF	–	302	–
USDA	4	73	39
TOTALS	3,211	3,374	1,334



TOTAL REPORTED FY74 EXPENDITURES – $3,374,000

TABLE 6-5

SUMMARY OF THE FEDERAL SURFACE VEHICLE NOISE RD&D PROGRAMS

SPONSORING AGENCY	*DESCRIPTIVE TITLE OF PROGRAM*	*FISCAL YEAR FUNDING ($1,000)*			
		PRIOR TO 1973	*1973*	*1974 (EST)*	*1975 (2)*
DOT	Highway Noise Reduction	2,066	1,798	1,429	935
	Urban Transportation System Noise Reduction Program	(1)	356	577	(1)
	Conventional Railroad & Intercity High Speed Systems	(1)	(1)	150	200
	TOTAL DOT	2,066	2,154	2,156	1,135
DOD/ARMY	Conformance with Regulatory Requirements		215	270	
	Vehicular Signature Reduction	100	100	95	
	Noise Reduction Program for U.S. Army Construction Vehicles		369	300	160
	TOTAL DOD/ARMY	100	684	665	160
EPA	Interstate Motors Carriers		170		
	Interstate Rail Carriers		199	178	
	New Medium & Heavy Duty Trucks				
	TOTAL EPA		369	178	
USDA	Reduction of Vehicle (snowmobile) and Equipment Noise Levels			25	39
	The Use of Trees and Shrubs in Noise Abatement			20	
	Noise & Vibration of Off-Road Equipment		4	28	
	TOTAL USDA		4	73	39
NSF	Effects of Building and Other Boundaries on Motor Vehicle Noise			30	
	Noise and Vibration from Transportation Vehicles and Other Machinery			272	
	TOTAL NSF			302	
	TOTAL FEDERAL EFFORT	$2,166	$3,211	$3,374	$1,334

(1) Resources for inhouse research and noise portions of advanced transportation systems development are not included.
(2) FY-75 estimates are known to be incomplete.

DOD/Army has three RD&D programs concerned with surface vehicle noise control: The Conformance with Regulatory Requirements, Vehicle Signature Reduction Program, and Noise Reduction Program for U.S. Army Construction Equipment. These programs are funded by the U.S. Army Tank Automotive Command (TACOM) and the U.S. Army Mobility Equipment Research and Development Center (MERDC). They address highway and off-highway military vehicles. The TACOM Conformance with Regulatory Requirements program is directed toward reducing interior and exterior noise levels of all tactical type military vehicles to meet military and commercial noise standards. The MERDC Noise Reduction Program for U.S. Army Construction Equipment was initiated as a result of the low noise exposure level requirements established by the Army Surgeon General and is concerned with the control of noise from both stationary and vehicular construction equipment. The TACOM Vehicle Signature Reduction program is concerned with reducing the noise signature detectability of military vehicles in combat. Portions of this program are classified. Although no other DOD surface vehicle research programs were identified, there is evidence that other pertinent noise reduction programs are being sponsored by DOD, particularly by the Navy on watercraft. DOD plans to continue a similar effort during the FY75 through FY78 period.

The EPA identified three surface transportation research programs sponsored in FY73 and FY74 to support the Interstate Motor Carrier, Interstate Rail Carrier, and New Medium and Heavy Duty Trucks Regulations. These studies generally involved the determination of the population impacted by the noise source to be regulated, best available noise control technology, costs for compliance with the proposed regulations, and measurement methods for enforcing the regulations.

The USDA sponsors surface vehicle noise research through the Forest Service and the Cooperative State Research Service. These programs are concerned with control of off-road vehicle noise and the use of trees and shrubs to abate noise. Only the off-road vehicle noise control research activities of the Forest Service are planned to continue into the future. The Cooperative State Research Service will continue to support noise research proposed by individual scientists and engineers.

NSF sponsors noise research based upon the merits of unsolicited proposals. Currently, there are two NSF research grants specific to surface vehicle noise: The Effects of Building and Other Boundaries on Motor Vehicle Noise and Noise and Vibration from Transportation Vehicles and Other Machinery. A third grant entitled, Basic and Applied Studies of Noise, has a minor portion of the study addressing sound generation by automotive tire designs.

FEDERAL MACHINERY NOISE RD&D

Figure 6-4 shows the Federal agency allocations for machinery noise RD&D during the FY73 through FY75 time period. A total of eight Federal agencies, including two components of DOD, are sponsoring machinery noise RD&D. The Navy program is the largest, committing about $1 million per year. However, the output of this effort is classified. In FY74, the other agencies together spent a total of more than $2 million on machinery noise RD&D. The total Federal effort has been in the range of $2 to $3 million per year for the FY73 through FY75 time period and appeared to peak in FY74.

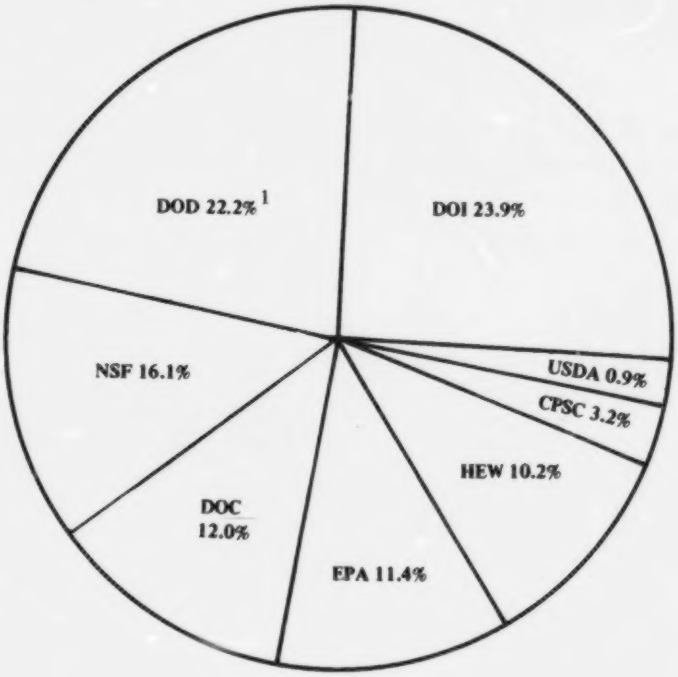
The current Federal machinery noise RD&D programs address a number of specific sources of machinery noise, undertake work in building and structural transmission of noise, and work toward better definition of the machinery noise problem through development of more accurate, standardized measurement methodology. The general funding in these areas is presented in Table 6-6. The majority of funds are spent on control technology. This observation is further supported by the Navy's $1 million a year program, most of which goes for source control technology. It also appears that the funds for machinery noise RD&D peaked in FY 74. This may not be actual, however, due to the uncertainty of the FY75 data.

The agencies current involvement in the three categories of machinery noise RD&D is shown in Table 6-7. USDA and CPSC currently are involved only in measurement or measurement methodology; NSF, DOD, and NIOSH are supporting research in all three areas, while Bureau of Mines, NBS, and EPA are involved in two categories.

FIGURE 6-4

SUMMARY OF FEDERAL EXPENDITURES BY AGENCY FOR MACHINERY NOISE RD&D PROGRAMS

AGENCY	*Fiscal Year Funding ($1,000)*		
	1973	*1974*	*1975*
DOI/BUMINES	337	528	730 (Projected)
DOD/USA[1]	178	490	245
DOC/NBS	138	264	265
NSF	243	356	–
EPA	60	251	100
HEW/NIOSH	16	226	138
USDA	–	20	92
CPSC	–	70	–
TOTALS	972	2,205	1,570



TOTAL REPORTED FY74 EXPENDITURES – $2,205,000

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[1] Navy funding for specific RD&D activities in Machinery Noise cannot be reported for security reasons. However, the total effort in this area is about $1 million each year.

TABLE 6-6

SUMMARY BY AREA OF MACHINERY NOISE RD&D

RD&D Area	*Fiscal Year Funding ($1,000)*		
	1973	*1974*	*1975*
Source Noise Control	529	1,307	1,168
Building and Structural Noise Transmission and Control	162	370	145
Measurements and Measurement Methodologies	280	507	257
TOTALS	971	2,184	1,570

TABLE 6-7

CURRENT AGENCY INVOLVEMENT IN AREAS OF MACHINERY NOISE RD&D

Research Area	*BuMines*	*NIOSH*	*NSF*	*DOD*	*NBS*	*EPA*	*CPSC*	*USDA*
Source Noise Control	x	x	x	x		x		
Building and Structural Noise Transmission and Control		x	x	x	x			
Measurements and Measurement Methodologies	x	x	x	x	x	x	x	x

APPENDIX A

GUIDELINES FOR REPORTING FEDERAL PROGRAM INFORMATION

This appendix consists of (1) the guidelines that EPA distributed to Federal agencies to obtain information on their noise related activities,* (2) a list of agencies to which the guidelines were sent, and (3) a glossary of agency acronyms.

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*The Department of Defense did not use this format to submit information on DOD noise related activities.

GUIDELINES TO FEDERAL AGENCIES FOR SUBMITTAL OF INFORMATION ON HEARING CONSERVATION PROGRAMS* TO EPA

1. In general, the information provided should provide a headquarters--level view of what the agency's hearing conservation program consists of. It should represent the Administrator's understanding of his agency's hearing conservation problems and of his program to meet the problems.

2. General description of hearing conservation in the agency, including if available, such items as:

   - Description of the noise exposure problems associated with the agency's operations

   - Incidence of hearing losses which have the audiologic characteristics of noise induced hearing loss.** Indicate whether your records distinguish between possible noise induced hearing loss and other causative factors; Number of hearing disability claims, over whatever time periods for which such data are available.

   - General programmatic information pertaining to hearing conservation including

     - policy statements
     - goals and objectives
     - plans and programs

3. Copies of any recent hearing conservation studies conducted by the agencies.

4. Problems that limit the effectiveness of hearing conservation programs, e.g.

   - shortages of trained personnel
   - technological
   - funding
   - mission requirements

5. Copies of internal regulations, instructions, etc., which define and govern the hearing conservation program of the agency.

*The term "hearing conservation" includes those activities directly concerned with the prevention of hearing loss among personnel - government and contractors whose duties expose them to potentially harmful levels of noise. Such programs normally include all or some of the following activities:

1. noise surveys
2. reduction of noise at the source
3. reduction of exposure via reduction of engineering solutions or management actions
4. periodic hearing testing (audiometry)
5. training programs of which hearing conservation is a part
6. use of hearing protection devices

Excluded from this category are those activities involving basic research on the effects of noise on the auditory system.

**This refers to the number of persons found to have a hearing loss of 25 dB or greater in one or both ears for audiometric frequencies of 2000Hz and above.

GUIDELINES FOR SUBMITTAL OF INFORMATION
ON
NOISE ABATEMENT PROGRAMS

1. These are primarily projects to reduce "over-the-fence" noise, (Executive Order 11752) but also projects to improve working environments at Federal installations which are noisy but not hazardous to hearing.

2. Provide any documentation that is available to indicate the extent of "over-the-fence" noise problems at agency field installations, such as citizen complaints and community noise surveys.

3. Provide brief descriptions of each noise abatement program and project, including funding.

4. Include plans for future programs and projects and their funding requirements.

5. Provide any information of a general nature regarding noise abatement programs including:

   - policy

   - goals and objectives

6. Include copies of any agency instructions, procurement specifications, etc., pertaining to noise abatement.

FISCAL DATA

1. A breakout of funding for noise related work by fiscal year. Actual expenditures for several previous years (1972-74) and anticipated expenditures for future years. Breakout dollars in whatever way is most meaningful for the specific agency but, to the extent practicable, in the three areas (i) research, development, and demonstration; (ii) noise abatement ("over the fence") projects' and, if possible, (iii) hearing conservation programs. Qualify the data as appropriate to make clear any areas of uncertainty in cost accounting, or in any other way that will enable the information be correctly interpreted. Also, to the extent practicable separately identify funding and expenditure data according to whether it represents in-house or contracted resources.

2. Accompany the fiscal data with a brief discussion of the agency's overall objectives and activities in the noise field. This information should be at a level of detail that would ordinarily be considered appropriate for submittal to OMB.

GUIDELINES TO FEDERAL AGENCIES FOR SUBMITTAL OF INFORMATION ON RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAMS

This information should include data of the following kind:

- Citation of legislative authority for RD & D programs.
- Description of RD & D programs
  - as they relate to general or broad agency missions and objectives
  - program goals, schedules and funding by fiscal year (as applicable)
- Descriptions of specific projects within programs and of the relationship of project objectives to program objectives; funding by fiscal year; requirements for special facilities and equipment; major accomplishments to date, and copies of published papers, reports, etc.
- Long range plans for RD & D

FEDERAL AGENCIES FROM WHICH INFORMATION WAS REQUESTED BY EPA

United States Department of Agriculture

United States Department of Commerce

United States Department of Defense

United States Department of Health,Education, and Welfare

United States Department of Housing and Urban Development

United States Department of the Interior

United States Department of Justice

United States Department of Labor

United States Department of State

United States Department of Transportation

United States Department of the Treasury

ACTION

Atomic Energy Commission *

Civil Aeronautics Board

Civil Service Commission

Consumer Product Safety Commission

Counsel of Environmental Quality

Environmental Protection Agency

Federal Communications Commission

Federal Deposit Insurance Corporation

Federal Maritime Commission

Federal Power Commission

Federal Trade Commission

General Accounting Office

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* Information for this report was submitted by AEC prior to reorganization and establishment of ERDA and NRC.

General Services Administration

Government Printing Office

Interstate Commerce Commission

Library of Congress

National Aeronautics and Space Administration

National Labor Relations Board

National Science Foundation

Office of Economic Opportunity

Securities and Exchange Commission

Selective Service System

Small Business Administration

Tennessee Valley Authority

United States Postal Service

Veterans Administration

GLOSSARY OF AGENCY ACRONYMS

SYMBOLS	AGENCIES/COMPONENTS
USDA	Department of Agriculture
DOC	Department of Commerce
NBS	National Bureau of Standards
NOAA	National Oceanic and Atmospheric Administration
NTIS	National Technical Information Service
SESA	Social and Economic Statistics Administration
DOD	Department of Defense
USAF	Department of the Air Force
USN	Department of the Navy
HEW	Department of Health, Education and Welfare
ADAMHA	Alcohol, Drug Abuse, and Mental Health Administration
FDA	Food and Drug Aministration
HRA	Health Resources Administration
HSA	Health Services Administration
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
SSA	Social Security Administration
HUD	Department of Housing and Urban Development
DOI	Department of the Interior
APA	Alaska Power Administration
BPA	Bonneville Power Administration
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BR	Bureau of Reclamation
MESA	Mining Enforcement and Safety Administration

GLOSSARY OF AGENCY ACRONYMS

(CONTINUED)

SYMBOLS	AGENCIES/COMPONENTS
DOJ	Department of Justice
DOL	Department of Labor
OSHA	Occupational Safety and Health Administration
DOT	Department of Transporation
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
BMCS	Bureau of Motor Carrier Safety
FRA	Federal Railroad Administration
UMTA	Urban Mass Transportation Administration
USCG	U.S. Coast Guard
AEC	Atomic Energy Commission
CAB	Civil Aeronautics Board
CSC	Civil Service Commission
CEQ	Counsel on Environmental Quality
CPSC	Consumer Product Safety Commission
EPA	Environmental Protection Agency
ONAC	Office of Noise Abatement and Control
FCC	Federal Communications Commission
FDIC	Federal Deposit Insurance Corporation
FPC	Federal Power Commission
FTC	Federal Trade Commission
GAO	General Accounting Office
GSA	General Services Administration
FSS	Federal Supply Service
GPO	Government Printing Office
ICC	Interstate Commerce Commission
NASA	National Aeronautics and Space Administration
NLRB	National Labor Relations Board
NSF	National Science Foundation
OEO	Office of Economic Opportunity
SEC	Securities and Exchange Commission
SBA	Small Business Administration
TVA	Tennessee Valley Authority
VA	Veterans Administration

APPENDIX B

HEARING SURVEY QUESTIONNAIRE

This appendix contains a questionnaire developed to survey hearing conservation programs in the Federal Government. The questionnaire was developed by a team of experienced hearing conservation specialists.

EPA QUESTIONNAIRE ON HEARING CONSERVATION

DATE ____________________

Name of Federal Facility____________________
Address____________________Telephone____________________
Department of____________________
Person (s) Preparing Questionnaire____________________
Title____________________

GENERAL CONSIDERATIONS

1) For how many years has your facility performed the following?

   a) NOISE Surveys ____________
   b) NOISE Control & Abatement ____________
   c) Audiometer Testing ____________
   d) Audiogram evaluations ____________
   e) Provided Hearing Protectors ____________

2) Who actively directs your overall hearing conservation program?

   a) TITLE____________________ FULL TIME: YES_____ NO_____

If direction is split, state responsibility of each and show hours per week allotted:

Hours

   b) Physician ____________________
   c) Nurse ____________________
   d) Engineer ____________________
   e) Hygienist ____________________
   f) Technician____________________
   g) Other ____________________

3) Where and when did any of the above receive training in hearing conservation?

   a) ____________________
   b) ____________________
   c) ____________________
   d) ____________________
   e) ____________________
   f) ____________________
   g) ____________________

4) Number of Employees at Your Installation?

		Annual % Turnover
a) Civilian	____________	____________
b) Military	____________	____________
c) Outside Contractor	____________	____________
TOTAL	____________	

5) Can you approximately state how many of your total employees have in excess of 25 dB (ANSI, ISO) average threshold level over 500, 1000, 2000 Hz in both ears?

Yes____________; No____________, Number________

6) How many compensation claims for hearing loss have been filed in your installation during the past three years?

a) Three years ago ____________
b) Two years ago ____________
c) This year ____________
d) Total ____________

7) Have you had an OSHA inspection ? Yes____________No________

a) What noise problems were mentioned?
____
____

NOISE MEASUREMENT AND ABATEMENT

8) Who does your noise surveys and what is his (their) training?

a) ____
b) ____

(Please enclose three separate noise survey copies of recent date)

c) How long are noise surveys kept in your files?;________ years.

9) How many personnel daily are working in areas with noise levels as follows?

a) Less than 85 dBA for eight hours ____________
b) At 85 dBA for eight hours ____________
c) At 90 dBA for eight hours ____________
d) At 92 dBA for six hours ____________
e) At 95 dBA for fours hours ____________
f) At 97 dBA for three hours ____________
g) At 100 dBA for two hours
h) At 102 dBA for one and one half hours ____________
i) At 105 dBA for one hour ____________

j) Other (explain)______________________________

____

Total employees (should agree with 4 above) ____________

10) Do any of these shown below determine where noise surveys are made and how often?

	YES	NO
a) Departmental Supervisor		
b) Employee		
c) Industrial Hygienist		
d) Engineer		
e) Saftey Engineer		
f) Other (explain)		

____

11) Are the following areas surveyed for noise levels?

a) All production areas Yes__________ No__________ Frequency_____
b) All experimental areas Yes__________ No__________ Frequency_____
c) All storage areas Yes__________ No__________ Frequency_____
d) All office areas Yes__________ No__________ Frequency_____
e) Other (explain) Yes__________ No__________ Frequency_____

12) Are noisy areas requiring the use of hearing protectors clearly poste

Yes__________ No__________

13) Do you have noisy areas that cannot be reduced to acceptable levels?

a) 90 dBA and higher: Yes__________ No__________
b) Between 85 dBA and 90 dBA Yes__________ __________
c) Why?

i) Technologically unfeasible Yes__________ No__________
ii) Economically unfeasible Yes__________ No__________
iii) Insufficient engineering staff Yes__________ No__________
iiii) Other (explain)______________________________

____

14) Have you introduced any physical noise control measures in the last eighteen months? Yes__________ No__________

(Please attach any significant report explaining one of the measures)

15) Were these measures successful due to:

a) New machinery ____________________
b) New parts ____________________
c) Revised mountings ____________________

d) Baffling or shielding ____________________
e) Insulation absorption ____________________
f) Isolation ____________________
g) Other (explain) ____________________

____

16) How many months elapse between Noise Measurement inside your audiometric test booth or testing area? No.________________

(Please attach a copy of the most recent)

17) Does your Purchasing Department or other procurement source specify maximum noise levels for new equipment ordered?
Yes__________________ No__________________

HEARING TESTING

18) Considering total employment, check the applicable space for types and number of hearing tests given: (If partial-show % of total employment given)

a) Baseline at program start All____; None_____; % of Total__
b) Pre-employment or pre-placement All____; None_____; % of Total__
c) Termination of Employment All____; None_____; % of Total__
d) Periodic retesting All____; None_____; % of Total__
e) Total audiograms performed per year in House or by outsiders. __________________

19) If all employees are not given hearing test in a), b) and d) above, how are selections made for those actually tested? (Check appropriat

a) Those working in noisy areas only __________of more than____ d
b) Specified job classifications __________
c) Request by supervisor __________
d) Request-by-employee __________
e) Request by medical director __________
f) Other (explain) ____

____

20) Do you use an outside consultant for hearing tests? Yes______ No__

a) If yes,

1) What number of the total in 18) e) does he do?
2) Are his tests given: at his office __________
at your site __________
in a mobile van __________
combination of sites __________

3) Does he return original audiograms to you? ____________
4) Does he return computerized print out? ____________
5) If his testing is performed in a mobile van at your site, or via your in-house facilities, how many days per year are utilized? ____________
6) What is the annual cost of the service? $____________

b) Name and address of consultant:

____

____

____

c) Where and when did he receive his training?

____

____

21) If your hearing testing is done in house, show the number participating by function and where and when trained.

a) Audiologist No.__________ Where__________ When__________
b) Nurse No.__________ Where__________ When__________
c) Technician No.__________ Where__________ When__________
d) Engineer No.__________ Where__________ When__________
e) Physician No.__________ Where__________ When__________
f) Other No.__________ Where__________ When__________
g) What number of the above have taken refresher course No.__________

(If available, please enclose list of curriculum subjects of training course (s) and hours of duration)

22) How many audiometers do you have in use by types below?

a) Manual ____________
b) Self recording ____________

23) How frequently do you do biological calibration checks on your audiometer?

a) Daily ____________
b) Weekly ____________
c) Monthly ____________
d) After ____________ audiograms performed.

24) Is hearing testing performed:

a) in an audiometric booth ____________
b) in an open room ____________
c) To exclude temporary threshold shift (TTS) (14 hours after noise exposure) Yes________No__________. Is this

exclusion accomplished by: wearing of hearing protectors ____________
physical removal from noise area ____________
other (explain) ____

____

____

25) Are audiograms

a) Filed in medical folders? Yes________No________Kept how long______
b) Filed separately Yes________No________Kept how long______
c) Discussed with employee when significant change occurs?
Yes________No________

26) Considering test for new employees and retesting schedules for existing employees, is your overal audiometric testing program

	YES	NO
a) Currently up to date?		
b) If no -- How far behind are you in months :		

c) If no -- Why? (Check appropriate response)

1) Scheduling problems ____________
2) Understaffed testing personnel ____________
3) Poor coordination with personnel Section ____________
4) Other (explain) ____

____

27) Who interprets your audiograms?

a) No one ____________
b) In house physician ____________
c) Audiologist in house ____________
d) Outside consultant ____________
e) Technician ____________
f) Otologist ____________
g) Other (explain) ____

____

28) Are the interpretation findings recorded?

a) On the audiogram ____________
b) On an accompanying letter or report ____________
c) Not recorded at all ____________
d) Other (explain) ____________

____

(Please enclose a sample copy of an audiogram and your type of information chart or record from any employee)

29) Do you have hearing level criteria established?

- a) For any new employee hired Yes________ No__________
- b) For certain job classes or departments Yes________ No__________
- c) If yes - who determines this? (Please check)
  - 1) In house physician __________
  - 2) Supervisor __________
  - 3) Outside consultant __________
  - 4) In house technician __________
  - 5) Other explain __________

____

____

30) How many employees were referred out for otologic attention during the past twelve months?

- a) To employee's own physician: No __________
- b) To your facility's otologic consultant No __________
- c) How many otological reports were returned to you No__________
- d) None were referred __________
- e) Don't have records of this. __________

31) Do you conduct or provide audiometric tests other than air conduction studies? Yes__________ No__________

- a) Yes - by whom ;
  - 1) In house physician __________
  - 2) Audiologist __________
  - 3) Outside consultant or otologist __________
  - 4) Other (explain) __________

____

PERSONAL HEARING PROTECTORS

32) Do you provide protectors for employees? Yes__________ No__________

33) What types are used?

- a) Muffs __________
- b) Plugs __________
- c) Custom molded __________
- d) Malleable __________
- e) Other (explain) __________

____

____

____

34) How many protectors are issued per year?__________

a) To how many employees ____________

35) Who issues protectors and instructs in their use?

a) Nurse ____________
b) Medical personnel ____________
c) Technician ____________
d) Audiologist ____________
e) Other (explain) ____________________________________

____

36) Are employees charged for replacement protectors? Yes_____ No_____

37) Do you have motivational and educational programs for employees and supervision? Yes____________ No__________

a) If yes - is this done prior to issue of protectors Yes____ No___
b) If yes - is this program:

1) Presented once _______
2) Repeated periodically _______

c) If yes - who presents the program?

1) Hygienist ____________
2) Safety Engineer ____________
3) Medical Department staff ____________
4) Departmental supervisor ____________
5) Audiologist or technicians ____________
6) Other (explain) __________________________

____

38) Of the number of employees annually issued protectors (as in 34 a) above), approximately what percentage use the protectors all the time ______________________

39) Who monitors and enforces their wearing?

a) Supervisors ________________
b) Hygienist ________________
c) Safety Engineering ________________
d) Other (explain) ________________________________

____

40) Do you have an announced policy of enforcement? Yes________ No____

a) If yes - is it actually applied without exception? Yes____ No____
b) If yes - does it acheive its objective? Yes________ No____

APPENDIX C

DESCRIPTION OF FEDERAL NOISE CONTROL PROGRAMS BY AGENCY

This appendix provides descriptions of reported Federal agency regulatory and non-regulatory noise control programs summarized, respectively, in Sections 4 and 5 of this report. The descriptions are primarily based on the official agency responses to the EPA information guidelines contained in Appendix A and are organized in alphabetical order by agency, with the Federal Departments presented first. The treatment of each agency noise related activity (except for RD&D programs, which are discussed in Appendices D, E, F, and G) are organized in four categories where applicable:

1. Standards and regulations,
2. Hearing conservation,
3. Noise abatement, and
4. Technical assistance.

The EPA information guidelines were distributed to 38 Federal agencies, of which seven reported no involvement in either regulatory or nonregulatory noise control programs. The seven agencies are:

Civil Aeronautics Board
Council on Environmental Quality
Federal Maritime Commission
Federal Trade Commission
General Accounting Office
Interstate Commerce Commission
Office of Economic Opportunity

This appendix concludes with a summary of the United States participation in activities of international organizations concerned with noise research and regulatory development.

DEPARTMENT OF AGRICULTURE (USDA)

USDA reported solely on hearing conservation measures instituted by the Forest Service.

Hearing Conservation

The Forest Service reported that efforts to control hazardous noise encompass reduction of noise at the source, quieting specialized forestry equipment, and developing other aspects of a hearing conservation program including periodic examinations of all Forest Service employees exposed to hazardous noise to determine the extent of any hearing impairment. Additionally, personal hearing protectors approved for forestry operations are now available throughout the Forest Service.

The Forest Service submitted a copy of its publication "Protect Your Hearing!" (July 1974) designed for Forest Service employees. This brochure lists many commonly available hearing protectors, together with an effectiveness score calculated from data obtained from manufacturers or from independent laboratories and confirmed in some cases by Forest Service tests. The publication also reports the results of noise evaluation studies on the basis of which appropriate types of hearing protectors and conditions of use are recommended for Forest Service work situations and equipment identified as noise hazards. Permissible exposure times are stipulated for the operation of off-road vehicles. In some instances, hearing protection is recommended when not required by OSHA provisions.

No information on personnel or funding levels for hearing conservation activities was provided.

DEPARTMENT OF COMMERCE (DOC)

Reported DOC activities may be divided into hearing conservation and noise abatement.

Hearing Conservation

Information regarding hearing conservation activities was obtained from headquarters and a number of offices, bureaus, and services that are organizational subcomponents of the Department of Commerce.

The establishment of hearing conservation programs for Commerce employees is part of the in-house Occupational Safety and Health Program established by Department Administrative Order 209-4. DAO 209-4 vests direct responsibility for compliance with the OSHA safety and health standards in the heads of primary operating units. While the OSHA

"Occupational Noise Exposure" Standard 1910.95 is the basis for DOC hearing conservation activities, several DOC components, notably the National Bureau of Standards, utilize more stringent noise exposure levels for portions of their hearing conservation programs. Use of criteria other than OSHA requirements is discussed under applicable organizational components.

To assist operating units in complying with OSHA Standard 1910.95, the DOC safety staff has provided guidance material and instructions to designated primary operating unit safety managers for use in establishing individual programs, maintaining records, and purchasing hearing protective equipment. Department-wide instructions require that operating units identify and document occupational noise exposures at levels of 85 dBA and above as requested by the Office of Federal Employees' Compensation (OFEC), DOL so that OFEC may properly adjudicate compensation claims from Federal employees for work-connected hearing loss. In the absence of a DOC Program Guide on hearing conservation, operating units have been supplied with the National Bureau of Standards hearing conservation program guide and the NIOSH recommendations for an occupational noise exposure standard for use in establishing program requirements.

Safety managers of office-type activities have reported no hazardous, job-related, noise exposures to necessitate the establishment of formal hearing conservation programs. Industrial-type operations, such as the National Bureau of Standards and National Oceanic and Atmospheric Administration, do have established programs that are discussed in the following paragraphs.

No information on department-wide personnel or funding levels for hearing conservation programs was provided.

Department Headquarters

As a result of an NBS noise survey, a hearing conservation effort has been instituted to cover employees of the printing plant in the Office of Publications. Draft administrative instructions have been developed that parallel the NBS hearing conservation program guide with the addition of provisions for posting warning signs in high noise areas and the use of disciplinary action for employee noncompliance in wearing ear protectors. An audiometric testing facility was purchased for the Medical Division at a cost of $1,130, and a program for initial and periodic testing of employees was established. To date, 56 employees of the Office of Publications have been given initial audiograms by the Health Unit.

National Bureau of Standards (NBS)

The National Bureau of Standards' hearing conservation program is outlined in the NBS Safety Program Guide No. 4, "Hearing Conservation Program", dated September 1970, as amended. The general NBS policy is to keep noise levels as low as practicable through engineering control and selective purchasing of equipment. While the OSHA noise exposure standard is the basis for the NBS hearing conservation program, as a precautionary measure, employees who are occupationally subjected to sound levels in the 85 to 89 dBA range for periods of four or more hours per day are included in the audiometric testing program.

The NBS program provides for the review and measurement of occupational noise exposures; periodic audiometric examinations of employees exposed to potentially hazardous occupational noise; and personal protective equipment when engineering/administrative controls are not feasible or economically practicable.

The Safety and Fire Protection Section conducts sound surveys using a calibrated sound level meter. More sophisticated sound level measurement equipment is available if needed.

Audiometric examinations, using equipment meeting American National Standards Institute specifications, are given to employees exposed to potentially hazardous noise prior to the initial exposure, annually thereafter, and upon termination of exposure or employment. Employees exposed to levels exceeding permissable limits are required to wear approved ear protective devices as a condition of employment. The Health Unit fits employees with ear plugs and provides instruction on their use.

There has been one case of occupational noise-induced hearing loss at NBS for which a hearing disability claim was awarded. Exposure to high noise levels in wind tunnels, during the period 1955 to 1959, ultimately resulted in a 15 percent permanent partial binaural hearing loss for which an employee received compensation of $6,321.60.

Many noise exposures at NBS are intermittent as opposed to continuous exposures one could expect in a production facility. Examples of potentially hazardous noise exposures at NBS include but are not necessarily limited to:

Activity	*Exposure*
Aerodynamics	Wind Tunnel
Fibrous Systems	Paper Machinery
Computer Services	Computers/ADP Equipment
Power Plant	Steam & Chilled Water Generation Equipment
Special Services	Printing Machinery
Electrical Shop	High Voltage Equipment
Construction Shop	Woodworking Machinery
Grounds Maintenance	Grounds Maintenance Equipment and Jackhammers

NBS estimates that the cost of its hearing conservation programs totals $3,100 per year for FY72 to 74 and is expected to remain constant in the future. These expenditures are broken down as surveys—$1,000; ear protectors—$200; audiometric testing—$1,500; and miscellaneous costs—$400. No information was provided on personnel levels for hearing conservation.

National Oceanic and Atmospheric Administration (NOAA)

A copy of Chapter 64-27, "Hearing Conservation Program", of the NOAA Directives Manual was submitted, but no information on the actual implementation of the directive nor data on associated personnel or funding levels were provided.

The NOAA general policy, as in the case of NBS, is to keep noise levels as low as practicable through engineering control and selective purchasing of equipment. When use of engineering controls is impractical, approved personal protective equipment is to be used by all employees subjected to occupational noise levels exceeding the OSHA standard. For noise exposures in excess of 120 dB, both ear plugs and ear muffs are to be used. As a further precautionary measure, employees exposed to sound levels in the 85 to 89 dBA range for periods of four or more hours per day are included in the audiometric testing program, which requires audiograms prior to the initial exposure, annually thereafter, and upon termination of exposure or employment. Supervisory personnel are responsible for the implementation of these hearing conservation measures upon identification by NOAA safety staff of areas or operations where noise levels are potentially damaging.

National Technical Information Service (NTIS)

The National Technical Information Service hearing conservation program is part of a general safety program and encompasses noise surveys, periodic hearing examinations conducted by the Public Health Service, and provision of ear plugs or head sets upon employee request. Monthly inspections are conducted, particularly in the printing press area and the warehouse mailing operation. Semiannually, NBS conducts noise surveys with calibrated instruments. NTIS reported no incidents of hearing loss.

Patent Office

A noise survey of all Patent Office facilities indicated that the carpenter shop was the only area with noise levels exceeding OSHA requirements. The one employee exposed to excessive noise was given an audiometric examination that showed that no noise-induced hearing loss had occurred. The employee has been provided with hearing protectors and will be given annual audiometric examinations.

Social and Economic Statistics Administration (SESA)

The SESA hearing conservation program consists of a limited hearing examination program, noise surveys, engineering controls, and consideration of noise in purchasing and renting data and tabulating equipment. Noise exposure problems at the SESA center almost exclusively around computer operations and various terminal rooms located throughout the agency. Efforts are made to reduce sound levels by surrounding terminals with sound absorbing partitions and by placing acoustical tiles on walls and ceilings. Within the last two years, a noise survey was conducted in one computer operation where the sound level exceeded 90 dBA in a few areas due to the use of older model high speed printers that have since been replaced. The SESA Health Unit has begun periodic hearing tests on employees who work predominantly in the computer area. Only one of the 16 employees tested in both 1972 and 1973 showed any evidence of hearing loss. SESA reported no hearing disability claims within the last several years.

Noise Abatement

The only reported noise abatement activity at the Department of Commerce concerned the NTIS installation of acoustical barriers in general office areas where the noise level is annoying but not necessarily hazardous.

Although not reported by DOC, NBS is the organization responsible for the implementation of the Experimental Technological Incentives Program (ETIP). ETIP was established to develop and test Federal policies for stimulating technological innovation for the social and economic welfare of the Nation. ETIP focuses primarily on the utilization of the Federal Government power as a buyer, policymaker, and supplier of funds. Two ongoing ETIP projects, the power lawn mower and air conditioner procurement experiments, incorporate noise considerations.

The primary purpose of the power lawn mower experiment is to test if procurement of commercial products geared to performance specifications (in this case noise criteria) is a valid technology incentive mechanism. The Federal Supply Service (FSS) of GSA is the lead procurement agency, with participation by EPA, CPSC, OSHA, and, of course, NBS. The initial phase of the project has not been totally successful, since manufacturer proposals for the first procurement cycle have not been completely responsive. Plans for the second procurement cycle are now underway.

One purpose of the air conditioner procurement experiment is to test if application of performance factors in Federal bid evaluations is a viable technology incentive mechanism. The Federal Supply Service of GSA is the lead procurement agency with participation by

NBS, EPA and DOD. The primary technological innovation sought relates to improved energy efficiency, with noise reduction a secondary consideration. However, proposals received led FSS to delete the noise requirements for the first of the three procurement cycles of the project. Consideration is currently being given to including noise requirements in the second procurement phase.

DEPARTMENT OF DEFENSE (DOD)

DOD conducts hearing conservation, noise abatement, and technical assistance activities.

Hearing Conservation

The Department submitted individual responses for the Army, Navy, and Air Force, each of which conducts an extensive hearing conservation program.

Department of the Army

The overall objective of the Army hearing conservation program is the prevention of noise-induced hearing loss among military and civilian personnel. Reference to, and the authority for, the various aspects of a comprehensive hearing conservation program appear in over 50 Department of the Army regulations, circulars, technical bulletins, etc. Of particular importance are DA Circular 40-9, "Command Emphasis on Hearing Conservation Programs", and AR 385-10, "Army Safety Program". AR 385-10 establishes the Army Safety Program, of which the control of occupational noise is a major element, and delegates responsibility for conducting the safety program to various Department components. The Inspector General and Auditor General (Army Director of Safety) under the Deputy Chief of Staff for Personnel is responsible for overall supervision of the Army hearing conservation program and for assuring compliance with OSHA requirements. The Surgeon General is assigned responsibility for

1. Establishing health standards and monitoring compliance and
2. Providing assistance to commanders by conducting field investigations and special studies to evaluate potential health hazards and compliance with existing standards.

These functions are carried out by the U. S. Army Environmental Hygiene Agency (USAEHA) under the Office of the Surgeon General. Finally, Department of the Army Staff elements are responsible for implementation of effective safety programs within their agencies.

While Chapter IV of AR 40-5, "Health and Environment", generally outlines the components of a hearing conservation program and establishes minimum standards for noise exposure, the Army standards now in use are published in Technical Bulletin, TB-MED 251, "Noise and Conservation of Hearing". TB-MED 251 was first published in 1956 and later revised in 1965, 1972, and is currently under revision again. This Technical Bulletin outlines requirements for hearing conservation programs and establishes maximum recommended noise exposure levels that are more protective than the OSHA standard. At this time, the Department of the Army employs a hearing conservation criterion based on an 85 dBA exposure to steady noise regardless of duration of exposure. The specified criterion for unprotected exposure to impulsive noise is 140 dB peak. Since all small arms used in the military produce impulsive noise above this level, TB-MED 251 states that, "hearing conservation measures should be instituted and enforced when firing any weapon during training".

USAEHA worked with the Human Engineering Laboratories to develop noise limits for Army materiel, which have now been published as a Department-wide Military Standard (MIL-STD-1474). This document is now consistent with the hearing conservation criteria contained in TB-MED 251.

The increased emphasis on hearing conservation and the orientation of the Army program appear to EPA to have been influenced by the findings of a study, published in December 1971, which was conducted by Army staff of Walter Reed General Hospital under the sponsorship of the U. S. Army Medical Research and Development Command. The purpose of the study was to survey the incidence of noise-induced hearing loss among U. S. Army troops, Accurate hearing threshold data were obtained from a heterogenous sample of 2,726 men representing different branches and length of time of active duty. The study provided evidence suggesting that noise-induced hearing loss is the number one hazard to the health of Army personnel. The magnitude of the problem among career Army personnel with over 10 years on active duty is reflected in the following summary data:

- *Infantry* – 23.0% had hearing loss severe enough to require mandatory duty limitations (H3 profiles), and an additional 4.0% did not even meet minimum standards for retention on active duty (H4 profiles).
- *Artillery* – 29.8% had H3 profiles, and 3.2% had H4 profiles.
- *Armor* – 40.9% had H3 profiles, and 2.3% had H4 profiles.

The significance of this data is highlighted by the fact that no H3 or H4 profiles were observed among the sample of new inductees that were tested. The authors of the report, on the basis of their findings, stressed the obvious need for

- An Army-wide hearing conservation program
- The development and utilization of effective nearing protection devices
- A long-term prospective study of the incidence of hearing loss among Army personnel.

While the Army did not submit updated information on the incidence of hearing loss among personnel nor the number of hearing disability claims files, the Department stated that a study on the prevalence of hearing loss in the Army is currently underway.

Major sources of undesirable occupational noise produced by Army facilities and activities include industrial plants, firing ranges, airfields, demolition training sites, heavy construction equipment training areas, power generation plants, jet engine test cells, and mobile equipment. These sources and control techniques are discussed in greater detail under noise abatement since they are also sources of environmental noise.

The essentials of the Army hearing conservation program as outlined in TB-MED 251 include noise surveys, engineering controls, audiometry, use of hearing protective devices, and training and educational programs.

Periodic noise surveys, which are used to identify all personnel working in hazardous noise areas and to maintain an inventory of such areas, are one element in comprehensive hearing conservation surveys of installations with such programs. Thirty-eight surveys were conducted by USAEHA personnel in 1973. These surveys constitute a comprehensive evaluation of the medical, acoustical engineering, administrative, and education elements of the hearing conservation programs, while at the same time advice and consultation in these areas are provided. Information from the surveys is assembled, coded, and stored in a computerized noise data bank developed by USAEHA. This noise reference library will contain profiles of noise sources encountered throughout the Army and will assist in identifying remedial measures for other or similar sources.

The Army requires that acoustical engineering noise control measures be instituted to minimize or eliminate hazardous noise exposure. TB-MED 251 provides general guidance on the types of engineering controls available ranging from improved maintenance to operator isolation.

TB-MED 251 provides for the administration of baseline and subsequent periodic audiograms at least annually for all personnel identified as working in noise hazardous areas (i.e., above 85 dBA). The Bulletin also prescribes testing procedures, calibration techniques, and equipment specifications meeting accepted national and international standards. USAEHA is presently conducting a technical study designed to establish a Hearing Conservation Data Registry for the storage and analysis of audiometric evaluations. This will permit an analysis of the disposition of personnel demonstrating abnormal audiograms and will enable the Surgeon General to objectively evaluate the effectiveness of the overall hearing conservation program.

Use of hearing protective devices is required for all personnel and visitors exposed to hazardous noise. Personnel are fitted with devices under medical supervision, and information on the attenuation characteristics, fitting, care and use of personal hearing protective devices is contained in TB-MED 251 and Army educational materials. In addition, USAEHA is currently evaluating communication abilities with hearing protective devices on a close combat course.

The Army conducts hearing conservation education with particular emphasis given to the dissemination of technical and health information to personnel at the installation level. Health education materials have been developed including 10 series of posters describing the proper use and care of hearing protective devices and illustrating noise-induced hearing loss and its effect. These training aids are made available with a magnetic tape recording depicting three conditions of filtered speech that correspond to the degree of hearing loss illustrated on the posters. Also, four technical guides, films, records, and slides dealing with hearing conservation have been developed or procured and are sent to any post, camp, or station upon request. An annual hearing conservation course, designed to provide information to personnel responsible for the implementation and maintenance of such programs, has been offered by USAEHA for the last six years.

Specialized personnel participate in the Army hearing conservation program at both Headquarters and installation levels. A Bio-Acoustics Division was established at the USAEHA in the latter part of 1969. In 1972, a field-grade Medical Corps Officer was assigned as chief of the division, which numbers 17 and includes masters and PhD level audiologists, acoustical engineers, environmental noise scientists, as well as a PhD psychologist working in the area of psycho-acoustics. In 1971, 58 positions were approved for Medical Service Corps officer audiologists to be located at various installations throughout the world, and there are currently 55 such military audiologists serving in this capacity. These officers serve a dual purpose both as clinical audiologists assigned to a U. S. Army medical installation and as audiology assistants within the Health and Environment Service. Each officer is required to spend at least 50 percent of his time in the latter role, which includes responsibility for monitoring and implementing the local hearing conservation program.

The Army did not submit information on costs or budgeting for Department hearing conservation activities.

Department of the Navy

The basic objective of the Navy hearing conservation program is to prevent hearing loss in personnel assigned to areas of high intensity noise. The Bureau of Medicine and

Surgery has responsibility for directing and coordinating the Navy program. The first, formal comprehensive Navy hearing conservation program was initiated in 1955, and the basic instruction outlining program requirements has been revised several times. The current directive, BUMEDINST 6260.6B, was issued on March 5, 1970, and is directed at all U. S. Naval Commands, ashore and afloat, and applies to both civilian and military personnel. Commanding officers are assigned responsibility for overseeing the daily implementation of the program and, if required to submit a quarterly Occupational Health Report, must include information on the progress of hearing conservation efforts.

BUMEDINST 6260.6B specifies use of the OSHA permissable noise exposure levels based on a damage risk criterion level of 90 dBA. When the noise level exceeds 90 dBA, the Navy requires mandatory institution of a hearing conservation program. BUMEDINST 6260.6B does not establish a criterion for exposure to impacts or impulse noise. However, it is mandatory that all Navy personnel exposed to gunfire in training or test situations wear ear protective devices, regardless of the length of exposure. In addition, all personnel exposed to artillery fire under any circumstances are required to wear ear protectors.

The Navy did not submit information on noise exposure problems generated by its activities. However, BUMEDINST 6260.6B does cite gunfire, rockets, jet and propeller-driven aircraft, marine engines, and industrial equipment as sources generating noise that may cause hearing loss. No data was provided on the incidence of hearing loss or number of hearing disability claims for the Navy personnel.

The Navy hearing conservation program encompasses five functional areas –

1. Noise measurement and analysis
2. Engineering control
3. Audiometry
4. Education
5. Personal protective measures.

Noise Measurement and Analysis

Industrial hygienists and other medical personnel trained in noise measurement procedures conduct noise surveys ashore and afloat to identify potentially hazardous noise environments. Instrumentation used in such surveys meet ANSI standards. Areas, equipment, machinery, and tools found to exceed 90 dBA are identified and posted in accordance with specified procedures, and use of personal hearing protection is required. Each hazardous noise area, piece of equipment, or machine is conspicuously posted with a standardized decal, and each tool is conspicuously labeled.

Engineering Control

A variety of approaches are recommended and used in attempting to attenuate noise to acceptable levels. These include attenuation of noise at its source by engineering design, maintenance, substitution of processes (e.g., welding for riveting), isolation to a remote area, acoustical treatment of rooms, resilient mounting, source enclosure, use of ground mufflers on jet aircraft, use of sound-proof operator booths, and use of noise level specifications when ordering new equipment.

Audiometry

The Navy reported on their audiometric testing program in terms of instrumentation, training of personnel, and frequency and monitoring of audiograms.

Audiometers and audiometric testing rooms utilized by the Navy meet ANSI standards. Both self-recording and manual audiometers are used in determining pure-tone, air-conduction hearing thresholds. Physical calibration of audiometers as well as preventive maintenance and repair are performed annually. Technicians are required to check the audiometer against their own hearing each day or before beginning testing. Audiometric testing rooms are certified every two years. A standard audiometric procedure, as specified by the Inter-Society Council for Accreditation in Occupational Hearing Conservation, is followed, and approved recordkeeping is required

Personnel performing audiometry receive training that goes beyond that specified by the Inter-Society Council. The Navy has assigned a Navy Enlisted Classification to identify those hospital corpsmen having completed this course, and personnel are eligible for certification by the Council.

Threshold measurement by air-conduction is performed at audiometric test frequencies of 500, 1000, 2000, 3000, 4000, and 6000 hertz. All personnel exposed to hazardous noise receive a reference audiogram, which becomes a permanent part of the person's medical records, and is used as a baseline to compare changes in audiotory sensitivity occurring at a later date. Monitoring audiograms are conducted after three months' work in a hazardous noise environment. Thereafter, if there are no subjective complaints or if the difference is less than 10 dB at 200 hertz and below, or less than 15 dB at 300 hertz and above, monitoring audiograms are obtained annually.

BUMEDINST 6260.6B states that all military and civilian personnel should, to the extent feasible, receive audiometric examinations upon both entry and termination of service. The instruction also outlines procedures for the disposition of personnel whose audiograms indicate hearing impairment. However, the Navy did not submit any information on the actual implementation of these two provisions.

Education

Hearing conservation education, which is designed to convince both management and workers of the risks involved in noise exposure, is an important element of the Navy program. Primary responsibility for this educational process rests with medical officers assisted by industrial hygienists, nurses, aviation physiologists, hospital corpsmen, and safety personnel. An initial educational program has been implemented for all new personnel, which is supplemented by a continuing health education program utilizing handouts, films, brief talks, posters, and labels and decals denoting hazardous noise areas and equipment. Information provided in these formal educational programs is reinforced by medical department personnel at every opportunity (e.g., when personnel report for ear plug fitting, audiometry, and during visits to shops by industrial hygiene personnel).

Personal Protective Measures

In addition to educational programs, every attempt is made to make use of hearing protective devices as easy and comfortable as possible to ensure their optimal use. The Navy inventory includes insert type earplugs, semi-insert type of earcaps, the circumural or ear muffs, and the helmet. Ear plugs and ear muffs are sometimes used in combination. The selection of a hearing protective device depends on user acceptance, efficiency of attenuation of the device, the noise environment, and the job being done. Trained personnel perform careful sizing and fitting and provide instruction in the care, use, cleaning, and storage of hearing protectors. When reporting for hearing testing, personnel are required to bring their hearing protective devices for inspection.

Although the magnitude of the Navy program necessitates involvment of a relatively large number of personnel, no specific information on personnel levels or percentage of time allocated to hearing conservation activities was reported. In addition, the Navy did not submit data on program costs or budgeting.

Department of the Air Force (USAF)

The primary purpose of the Air Force hearing conservation program is to conserve the hearing of all personnel who are routinely subjected to potentially hazardous noise and to thus ensure continued retention and utilization of skilled and valuable personnel. The Air Force program covers more than 210,000 occupationally exposed employees. Since the majority of individuals entering the Air Force and potentially hazardous noise career fields possess hearing acuity that is consistently better than the normative non-noise exposed population of comparable age, it is imperative that stringent noise control and hearing conservation measures be initiated and enforced. The philosophy of the USAF hearing conservation program is based on the concept of continuous monitoring of the hearing acuity of personnel exposed to potentially hazardous noise, to detect temporary noise-induced hearing loss before permanent hearing damage develops.

The Air Force hearing conservation program, originally established as part of AFR 160-3, "Hazardous Noise Exposure", was introduced by the Air Force in 1956 and updated in 1960 on the basis of the best scientific information then available. It was prepared in close cooperation with the National Academy of Sciences – National Research Council (Committee on Hearing, Bioacoustics, and Biomechanics). Air Force Regulation 161-35, dated July 27, 1973, which establishes requirements that either comply with or are more stringent than those promulgated by OSHA, has superseded AFT 160-3 as the basis for the USAF hearing conservation program. This regulation establishes policies, assigns responsibilities, provides noise exposure standards, establishes a monitoring audiometry program, and directs effective coordination of Air Force activities regarding control of noise effects. AFR 161-35 provides detailed guidance for the conduct of all phases of the hearing conservation program. This guidance includes information on the scientific basis for program requirements, detailed specifications for acceptable types and use techniques for noise measurement and audiometric testing equipment, and in-depth treatment of procedural and reporting requirements. AFR 161-35 is supplemented by other Air Force directives that deal with specific noise situations such as sonic boom and siting of noise producing operations or that require annual surveys of all industrial areas suspected of being hazardous noise environments.

Air Force policy emphasizes that its hearing conservation program is not to be considered a substitute for the preferred method of using best practical technology to reduce or eliminate potentially hazardous noise. Utilization of specialized facilities and skills available in the service (e.g., USAF School of Aerospace Medicine) is a prominant feature in the USAF program, which consists of seven interrelated elements discussed in the following paragraphs.

Establishment of Noise Exposure Limits or Standards

AFR 161-35 specifies limiting values for total daily noise exposure, which are based on the prevention of damage to the hearing organs, maintenance of effective performance, and avoidance of damage or undesired responses of the whole human body. An 84 dBA limit for an 8-hour exposure is used to avoid damage to the hearing organs with a 4-dB time/intensity trading ratio and a ceiling of 115 dBA for exposure without adequate ear protection. The basic criterion for exposure of unprotected personnel to impulsive or impact noise is a sound pressure in excess of 140 dB peak. However, criteria are provided for impulse noise exposure for three different sets of operating conditions (i.e., sound fields consist of (1) many combined impulses, (2) repeated impulses without reflections, and (3) slowly repeated impulses with reflection of the sound wave). Due to the potential for damage, use of effective ear protective devices is required for all personnel involved in the firing of weapons.

AFR 161-35 also prescribes noise exposure limits that are applicable to differing work environments and that are directed solely toward the maintenance of effective job performance. Finally, an overall A-weighted sound level limit of 150 dB with exposure not to exceed a total of 20 minutes each workday, together with limiting values for sounds in the two frequency ranges 1-80 Hz and 12,500-40,000 Hz, are specified to avoid damage or undesired responses of the whole human body.

As stated in AFR 161-35, Air Force policy provides that exposures above these limiting values will only occur for reasons of unique military requirements and only in consultation with the USAF Hearing Conservation Data Registry. AFR 161-35 also identifies those primary occupational groups in which exposures to high noise levels may occur. These include aircraft maintenance, missile maintenance, armament systems maintenance and operation, munitions and weapons maintenance, metal working, marine, civil engineering, fire protection, fuel services, printing, and security police.

Indoctrination and Education

The Air Force education program is designed to instill strong elements of persuasion and understanding so that the individual becomes self-disciplined to protect himself whenever and wherever he encounters potentially hazardous noise. All personnel whose duties routinely entail exposure to hazardous noise receive initial and followup indoctrination concerning undesirable auditory and nonauditory effects of noise, use of personal ear protection devices, and methods and techniques used to effectively limit or control undesirable exposures.

Identification of Potentially Hazardous Noise Areas

General base surveys are conducted to identify those areas requiring more detailed and sophisticated acoustic noise evaluations. These latter evaluations, in addition to providing data for other elements of the program, are the basis for the establishment of specific exposure limits for areas and duties where hazardous noise exists and for the posting of noise-hazard areas.

Personal Ear Protective Devices

Such devices are provided to each individual who must work in potentially hazardous noise areas. AFR 161-35 provides extensive data on the performance and attenuation characteristics of various devices and requires that molded earplugs be carefully fitted by trained personnel.

Monitoring Audiometry

Pure-tone audiometric thresholds are obtained that represent a pre-exposure baseline, and audiometric examinations are periodically repeated on all personnel who routinely enter areas in which 84 dBA is exceeded and on those requiring Flying Class I, IA, II, or III examinations. There are approximately 17,000 pure-tone air-conduction threshold audiograms per month conducted in direct support of the hearing conservation program.

AFR 161-35 specifies in great detail the types of audiometric equipment and facilities to be used, frequency of, and procedures for, instrument calibration, and types, frequency, and evaluation procedures for performing audiograms. Monitoring audiometry is the single most important element of the hearing conservation program, which serves to identify employees for whom special personnel action must be considered.

Recordkeeping System

Medical, environmental, and administrative records are maintained for each employee and workplace where potentially hazardous noise exposure may occur. These records, which are maintained in the Environmental Health Section of Aerospace Medicine, must be used to evaluate program progress and to monitor the hearing status of exposed employees.

Personnel Disposition and Management Procedures

Supervisors and personnel managers are guided by competent medical advice relative to the medical control and administrative management of employees who demonstrate hearing loss, whether directly due to noise or not. Such procedures are necessary to ensure that individuals who exhibit noise-induced hearing loss do not acquire further auditory impairment as a result of continued exposures to occupational noise. Approximately 150 individuals per month are identified through monitoring audiometry as requiring further administrative or medical management. No information was submitted on the incidence of hearing loss or number of hearing disability claims for Air Force personnel.

The Air Force program is supported, in part, by more than 60 otolaryngologists and audiologists and directed by more than 130 Bioenvironmental Engineers at the installation level. As of 30 June 1974, 342 technicians had received training, performed by accredited instructors and meeting professional society requirements, leading to certification as an Air Force Hearing Conservationist.

No funding information on program costs or budgeting was submitted.

Noise Abatement

The Department of Defense submitted individual responses for the Army, Navy and Air Force, each of which conducts extensive noise abatement programs. However, as all three military departments participate in the Air Installation Compatible Use Zones (AICUZ) program within the framework established by the Department of Defense, the general policies and procedures of this program are discussed in the following paragraphs.

The increasing frequency of community encroachment, especially residential development, on privately owned lands abutting military air installations has led to the establishment of the AICUZ program. The purpose of AICUZ is to prevent incompatible development in high noise exposure areas, to minimize public exposure to potential safety hazards associated with aircraft operations, and to protect the operational capability of the air installation.

DOD Instruction 4165.57 published on July 30, 1973 with the concurrence of the Federal Property Council and the Office of Management and Budget, describes the procedures by which compatible use zones may be defined and provides policy on the extent of Government interest in real property within these zones. This Instruction, which applies to air installations of the military departments located within the United States, its territories, trusts, and possessions, requires that as a first priority step, all reasonable, economical, and practical noise source control measures be taken. Typical measures normally include siting of engine test and runup facilities in remote areas if practical and provision of sound suppression equipment where necessary and may include adjustment of traffic patterns to avoid built-up areas where such can be accomplished safely and without significant impairment of operational effectiveness.

After all reasonable noise source control measures have been taken, there will usually remain significant land areas in which the total noise exposure is incompatible with certain types of land development. In these situations, DOD Instruction 4165.57 provides that attempts should be made to work with local governing bodies, planning commissions, zoning boards and similar bodies to alleviate problems by zoning or similar local measures. Where practical and advisable, necessary rights in land within the AICUZ may be obtained through land exchange, purchase, donation, or other methods, or retained for the protection of the operational capability of air installations. Such restrictive easements may include the right to make low and frequent flights over land or the right to restrict the use of the area for human habitation and construction of dwellings, except as to pre-existing dwellings. The Instruction also establishes general criteria under which acquisition or disposition of interests should be carried out and requires the Secretaries of the Military Departments to

1. Develop and implement a plan to investigate and study all air installations in necessary order of priority to develop an AICUZ program for each.
2. Prepare recommendations for individual installations on AICUZ programs based on the results of such studies.
3. Take action to assure
    a. Sustained cooperation with local authorities and public awareness of DOD efforts
    b. First priority is given to the use of noise source control measures.

Reported implementation of these requirements is treated under the descriptions of the three military departments' noise abatement programs which follow.

The AICUZ program is designed to be evolutionary in nature and to be responsive to differing State and local conditions. In addition, DOD has worked with other agencies (e.g., HUD, EPA) involved in land use planning and community noise control as is evidenced by a recent DOD internal memorandum requiring that the L_{eq}/L_{dn} methodology, used in the EPA "Levels Document" as the uniform environmental noise descriptor, be incorporated into the AICUZ program.

Department of the Army

The Army noise abatement program is one of two phases of a reportedly comprehensive program, still in its early stages of formulation. The program has been stimulated by an increased awareness of the impact of undesired noise produced by Army activities. The purpose of the program is to protect the health and welfare of members of the military services and the public adjacent to Army installations.

The Army reported the following summary of funding for noise pollution control:

FY	*Dollars (in thousands)*
74	1,200
75	2,570
76	2,000 (est.)
77	3,000 (est.)
78	2,000 (est.)

As a result of the Noise Control Act of 1972 and the National Environmental Policy Act of 1969, the Army has undertaken environmental noise pollution assessments of existing operations and has programmed military movements and activities in accordance with DOD and Army Directives. Installation commanders are provided consultative services in quantifying noise problems and identifying abatement measures by the Bio-Acoustics Division, U. S. Army Environmental Hygiene Agency. Since FY71, 10 comprehensive environmental noise pollution assessments of aircraft operations, artillery ranges, vehicles, and stationary noise sources have been completed. In addition, the Army has published AR-200-1, an environmental protection and enhancement regulation, Chapter 7 of which deals entirely with noise abatement. Specific Army noise abatement efforts are directed at both fixed facilities and mobile sources.

The major sources of undesirable ambient noise produced by Army fixed facilities and activities include industrial plants, firing ranges, airfields, demolition training sites, heavy construction training areas, power generation plants, and jet engine test cells.

Attention is being focused on various noise sources as indicated by the following listing of noise surveys and special studies conducted by the U. S. Army Environmental Hygiene Agency since FY71:

Environmental Noise Assessments	20
Acoustical Engineering Studies	36
Hearing Conservation Surveys	113

Particular attention has recently been directed towards making noise assessments of Army airfields. Fourteen such studies were conducted in the last two years. These resulted in changes in flight scheduling, modification of flight patterns, maintenance of standard flying altitudes and reductions in training flights.

Corrective measures for noise problems are taken either at the source, path, or receptor. Presently, the corrective measures applied to the noise source have been limited primarily to the regulation of operating hours. For example, the operation of certain airfields and firing ranges is confined largely to daylight hours and limited to essential activities on weekends. In addition, increased attention is being given to reducing noise levels at receptors on an installation by using modern acoustic materials in building construction. Contract specifications require such materials to be utilized in new hospitals as well as in academic and administrative facilities.

Interest in the control of noise from mobile sources, such as trucks, helicopters, and tracked vehicles, is twofold, since noise abatement measures will also make the equipment less readily detectable in tactical situations. Much of the work on vehicles and aircraft is also related to signature reduction, particularly important in a combat environment. In addition, the Army design standard, MIL-STD-1474 (MI), Noise Limits of Army Materiel, attempts to control noise levels before equipment reaches the field.

The Army reported that significant progress was made in 1973 in the Army program to determine the noise levels for military vehicles. Tests were completed on the ¼ ton truck (Jeep), 2½ ton and 5 ton trucks, "Gamma Goat", and the M-746 Heavy Equipment Transporter to determine noise levels produced by various components of each vehicle; e.g., fan, exhaust system, and engine shrouds. Sound absorbent materials are being designed for the cab areas. Special studies were also initiated to better define the noise produced by tires and the track systems used by tanks and personnel carriers. Driver education, with emphasis placed on proper vehicle operation and maintenance, together with routing trips to avoid noise-sensitive areas, is an important facet of the Army vehicle noise reduction effort.

The increased numbers of helicopters in tactical units and the continuing requirement to maintain flying proficiency of pilots have given rise to citizen complaints about helicopter noise in off-post areas. Abatement measures have been taken that include modification of the aircraft and adjustments to flight procedures. A program, costing approximately $2 million over a 7-year period, has resulted in significant reduction in rotor blade and jet engine noise levels. However, most effective in reducing complaints has been the imposition of operational changes such as restricted flight patterns, specifying flying altitudes, and curtailing night and weekend flying when necessary.

No information was provided on the number of personnel involved in or percentage of their time allotted to Army noise abatement activities.

Department of the Navy

The Navy submitted the following summary financial data for on-going noise abatement projects and future planned activities in this area.

FY	*Dollars (in thousands)*
73	352
74	1,913
75	1,760
76	23,960
77	32,400
Post-77	527,500
Total	587,885

This data includes all identified over-the-fence noise abatement projects requiring capital expenditures in excess of $50,000 as well as some projects for less than $50,000. However, not all projects for less than $50,000 are included in the financial summary, since considerable noise abatement work is carried out by local commanding officers utilizing funds available to them for small projects. In response to Executive Order 11752, the Navy has provided EPA with its 5-year noise control plan contained in the "Noise Pollution Control Report", dated June 30, 1974. This special report describes noise abatement projects at specific Navy installations and fiscal breakouts for these projects, the overall totals for which were just shown.

The Navy AICUZ implementation program costs represent a substantial proportion of the total noise abatement funding. Total AICUZ funding is as follows:

FY	*Dollars (in thousands)*	*% of Total Navy Noise Abatement Funding*
73	251	71%
74	575	30%
75	800	45%
76	18,100	76%
77	20,400	63%
Post-77	403,500	76%
Total	443,626	75%

These figures include both estimated costs for the acquisition of restrictive easements at various locations together with funding for AICUZ planning studies and project development. In accordance with the requirements of DOD Instruction 4165.57, the Secretary of the Navy has provided commanding officers with guidance and assistance in carrying out interim measures prior to the completion of the AICUZ study and the development of a specific strategy for each Naval air station.

In addition to the AICUZ program, the Navy "Noise Pollution Control Report" identifies both noise abatement projects designed to alleviate specific noise problems through engineering controls, together with programs which are broader in scope and have more widespread applications: Specific projects at identified locations for the FY 1973-1976 period include:

- Procurement and installation of acoustical enclosures for aircraft runup facility for F-14 and other aircraft at Miramar Naval Air Station – $2,300K (FY76).
- Replacement of acoustical baffling on jet engine test cells at Alameda Naval Air Station – $125K (FY76).
- Procurement and installation of an acoustical enclosure aircraft runup facility for F-14 and other aircraft at El Toro Marine Corps Air Station – $2,000K (FY76).
- Installation of sound suppressors on steam pressure reducing stations at San Diego Navy Public Works Center – $31K (FY76).
- Relocation of rocket testing and test firing of pyrotechnics facility to remote site at Seal Beach Naval Weapons Station – $50K (FY76).
- Rehabilitation of test cell for BQM-34A supersonic aerial target at North Island Naval Air Station – $30K (FY76).
- Provision of GCA/TACAN equipment, maintenance, and operating facilities to allow operation of new equipment located on east-west runway at North Island Naval Air Station – $47K (FY76).
- Provision of sound reduction doors for jet engine test cells at Naval Air Rework Facility – $1K (FY73) and $18K (FY76).
- Installation and/or construction of noise suppression devices, systems, and facilities to correct specific noise problems at nine locations – $10K (FY73), $28K (FY74), $159K (FY76).

The following on-going or proposed noise abatement activities are more general in scope and application than those projects designed to rectify individual noise problems mentioned above:

- Studies to develop cost-effective engineering control methods, feasible alternatives, design criteria and special designs for the control of noise from various sources – $10K (FY74), $300K (FY76), $300K (FY77), $300K (Post FY77).
- Preparation of technical training and operational manuals relating to the Navy noise pollution control program – $200K (FY76), $200K (FY77), and $100K (FY77).
- Construction of modern noise suppression systems and facilities for use in controlling noise from industrial facilities, construction, vehicles, and aircraft operations – $1 million (FY77) and $1 million (Post-FY77).
- Development of plans and specifications for noise pollution control systems and facilities – $100K each for FY76, FY77 and Post-FY77.
- Jet engine noise study for aircraft acoustical enclosure at Naval Facilities Engineering Command – $260K (FY75).

- Study to develop, test and evaluate noise suppression systems for aircraft runup and engine testing – $90K (FY73), $1.3 million (FY74), $700K (FY75), and $500K (FY76). This project is funded with Research, Development, Test and Evaluation monies.

Department of the Air Force

The Air Force reported on two types of noise abatement activities: sound suppression at the source and participation in the AICUZ program.

The Air Force conducts an active program for the acquisition of sound suppressors for maintenance runup operations, which has the following objectives:

- Protect maintenance personnel performing test and trim operations from sound intensities of over 135 decibels.
- Eliminate the hearing damage risk for personnel without ear protection working up to eight hours a day at 250 feet or more from power check pad or jet engine test stands.
- Provide a communication environment inside a frame building, with windows and doors partly open, equivalent to that normally experienced in shop areas with moderately noisy machinery or in hangars used for routine aircraft maintenance when operated at 500 feet from such a building.
- Provide sufficient suppression so that essentially no complaints would be expected from a residential community 2500 feet from the power check pad or jet engine test stand while making up to five single runs per day of more than five minutes' duration between the hours of 0700 and 2200.
- Allow continuous around-the-clock operations one mile from a residential community.
- Ground runup sound suppressors have been and continue to be acquired for fighter type aircraft and fighter trainer aircraft.

Funding levels for this program are:

FY	*Dollars (in thousands)*
68-72	23,143
73	5,400
74	3,600
75	4,000
76	4,000
77	4,000

To comply with the provisions of Executive Order 11752 and a proposed Toledo, Ohio noise ordinance, the Air Force has identified a specific noise abatement project at Air Force Plant 27, Teledyne CAE, in Toledo. The project, which is estimated to cost

$81,000 during FY76, calls for the installation of new silencers on a vacuum pump exhaust and installation of a muffling device on the altitude bleed pipe in order to reduce the noise of test facilities which contributes to sound levels of 80 to 85 dBA at the plant boundary.

Coincident with the development of the Air Force Air Installation Compatible Use Zone (AICUZ) program, a multidisciplinary Environmental Planning Division composed of city planners, engineers, architects, and landscape architects was established within the Directorate of Civil Engineering. Among their environmental planning responsibilities is the AICUZ program, which will be applied to all installations with active flying missions. Their job is to develop the broad base of (1) tools (maps, and noise/safety data), (2) planning systems, and (3) policies consistent with federal land use and environmental protection legislation necessary to support commanders seeking compatible land use planning in concert with local civic planners and officials.

AICUZ guidance for the revised program was issued in the following phases to correspond with the continuing refinement of the AICUZ methodology, the availability of technical procedures, and the development of land use compatibility criteria:

- Phase I: AICUZ Implementation Team formation and data collection.
- Phase II: Review and refinement of Phase I results.
- Phase III: Preparation of Day-Night Average Sound Level (L_{dn}) maps based on the results of Phase I and II.
- Phase IV: Preparation of AICUZ maps and land use compatibility recommendations.
- Phase V: Presentation of AICUZ for the implementation by local governments.
- Phase VI: Maintenance of the AICUZ.

Air Force policy is to encourage achievement of compatibility between air installations and neighboring civil communities by means of a compatible land use planning and control process conducted by the local community. The systems for identifying and assessing land use compatibility is derived from the AICUZ concept. This concept embodies a process of projecting, mapping, and defining aircraft noise and accident potential areas within the air base environs. Land use compatibility guidelines are applied to these areas and serve as the basis for Air Force recommendations to the communities for use in their land use planning and control process.

Air Force commanders at major command and base level establish and maintain active programs to achieve the maximum feasible land use compatibility between air installations and neighboring communities. The program requires that all appropriate governmental bodies and citizens are fully informed whenever AICUZ or other planning matters affecting the installation are under consideration. This includes positive and continuous programs designed to:

1. Provide information, criteria and guidelines to federal, state, regional and local planning bodies, civil associations and similar groups.
2. Inform such groups of the requirements of the flying activity, noise exposure, aircraft accident potential and AICUZ plans.
3. Describe the noise reduction measures which are being used.

All reasonable, economical, and practical measures are taken to reduce or control the impact of noise-producing activities. These measures include such considerations as proper location of engine test facilities, provision of sound suppressors where necessary, and adjustment of flight patterns and techniques to minimize the noise impact on populated areas. This is done without jeopardizing safety or operational effectiveness.

The Air Force reported that the complexity of the AICUZ program as well as the wide distribution of resources applied to the program prevent an accurate estimate of its funding without the expenditures of significant resources.

Technical Assistance

A fundamental element in achieving the objectives of the AICUZ program described above is sustained cooperation with local governing bodies and zoning boards in order to alleviate noise problems through means other than Federal acquisition of land interests. The Army, Navy, and Air Force, charged with implementation of the AICUZ program, did not provide specific information on consultation measures initiated or planned to facilitate local authority participation in the program. However, the following desired practices, specified in DOD Instruction 4165.57 emphasize the requirement for DOD technical assistance efforts:

1. Whenever zoning is selected as the method of land control, which is desirable in that land is not removed from tax rolls and Federal involvement is minimized, responsible installation commanders must assure that constant attention is given to the action of local zoning authorities. In addition, positive and continuous informational programs are to be established and maintained for local governing bodies, civic associations, and similar groups in order that the citizenry may be advised whenever matters affecting the air installation are under consideration. Local ordinances requiring that persons contemplating purchase, rent, or lease in high noise areas be fully informed of such noise are encouraged.
2. Agreements with local governing bodies affording the Federal Government the opportunity to meet with them whenever any proposed actions affecting land within the AICUZ are under consideration, should be sought, and testimony should be presented in open hearings. Where statutes allow, comprehensive plans developed by local planning/zoning officials with the cooperation of the Federal Government are encouraged.

3. Since effective state land use legislation could prove more permanent than local zoning authority actions, it is to be considered highly desirable.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW)

HEW reported hearing conservation, noise abatement, and technical assistance activities.*

Hearing Conservation

The Department submitted information on six Public Health Service Agencies and the Social Security Adminstration. Of the six Public Health Service Agencies, only three (National Institutes of Health (NIH), National Institute for Occupational Safety and Health (NIOSH), and the Food and Drug Administration (FDA)) indicated any involvement in hearing conservation. Both NIOSH and FDA reported no serious noise exposure problems and have instituted limited preventive measures rather than formal hearing conservation programs. NIH has a fully operational hearing conservation program which, while complying with OSHA requirements, utilizes a more stringent 85 dBA standard. The Alcohol, Drug Abuse, and Mental Health Administration, the Health Resources Administration, and the Health Services Administration reported no involvement in hearing conservation activities.

Food and Drug Administration (FDA)

In conformance with OSHA standards, noise surveys are conducted in areas of potential exposure, and protective equipment (ear muffs, plugs) is provided when OSHA limits are approached. FDA noise problems are minimal, and no exposures in excess of the OSHA limits have been documented.

National Institutes of Health (NIH)

The overall goal of the NIH hearing conservation program is to prevent noise-induced hearing losses among its employees and to provide for acceptable noise levels in the work environment of all employees. All NIH components involved in the hearing conservation program are required to comply with OSHA standards and related Federal regulations and laws governing noise control and prevention. However, NIH adheres to the NIOSH recommendations that an 85 dBA, 8-hour exposure level be applicable to all newly designed occupational exposure environments after six months from the effective date of the standard. The NIH hearing conservation program is activated when the 85 dBA level is reached and encompasses noise source reduction, use of hearing protectors, periodic audiometric testing, and processing and review of hearing disability claims. These functions are carried out by the Environmental Service Branch (ESB) of the Division of Research Services, the Employee Health Service (EHS), and the Safety Management Program.

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*The role of the National Institute for Occupational Safety and Health (NIOSH) relative to noise regulations promulgated under the Occupational Safety and Health Act is treated under the Department of Labor discussion.

The Environmental Services Branch has one engineer and one technician who either routinely or upon request conduct noise surveys of areas with potentially harmful levels of noise and who make engineering or administrative recommendations to reduce the noise to a safe level. The surveyed areas are revisited and tested to insure that implementation of the recommendations has alleviated the problem. ESB also conducts training programs on the proper use of hearing protection and the importance of hearing conservation.

The Employee Health Service conducts an audiometric test, administered by a nurse and reviewed by an M.D., on all new employees assigned to areas having potentially harmful levels of noise. Other new employees, because of their personal medical history, may be given an audiometric test. In the future, it is planned to give all new employees a hearing test. New employees assigned to noisy areas are fitted with ear plugs and are instructed in their use and care. These employees are periodically re-tested (approximately 180 employees a year), and Federal Employees' Compensation Act (FECA) criteria are used to determine if any noise-induced hearing loss has occurred. If more extensive testing is required, employees are sent to a DHEW specialist.

The Safety Management Program coordinates the NIH safety program and interprets Federal regulations on hearing loss claims. The number of claims filed with the Office of Employees' Compensation, DOL, since 1971 is 35 (1 denial, 4 awards, and 30 pending action). Most claims filed are by employees working in areas of potentially harmful levels of noise.

NIH identified noise exposure problems in the power plant, incinerator, printing shop, carpenter shop, and animal cage washing operations. The major problem limiting the effectiveness of the program is the employee attitudes towards ear protectors – either forgetting or refusing to wear ear plugs.

No specific figures were reported for either personnel or funding levels for hearing conservation programs.

National Institute for Occupational Safety and Health (NIOSH)

Since serious workplace noise problems within NIOSH were reported to be almost nonexistent, no comprehensive internal hearing conservation program exists. However, the extensive facilities, laboratories, and expertise of the Institute's noise program are available as needed, and their use is discussed under Section 3 of this report. The one employee (a carpenter) who is occasionally subjected to borderline noise exposure has been provided with personal protective equipment and instructed in its use.

Social Security Administration (SSA)

The Social Security Administration appears to EPA to be integrating and refining ongoing hearing conservation efforts into a comprehensive program. The SSA is developing management directives that will spell out responsibilities and detail a program to control exposure to hazardous noise levels. These directives will provide for:

- Keeping noisy work areas under surveillance including the institution of engineering controls.
- Orienting personnel in the undesirable effects of noise.
- Issuing personal protective devices and instructions for their use.
- Minimizing exposure of personnel to intense noise in work areas where engineering controls are not feasible or sufficient.
- Monitoring audiometry.

The recently created Occupational Health and Safety Management Staff within the Office of Administration is now responsible for hearing conservation programming. The Employee Health Service provides the clinical services necessary to periodically test the hearing of the 210 employees involved in the monitoring audiometry program.

The SSA has pinpointed operating and shop areas in which noise levels are at or about 85 dBA. Surveillance records are maintained in such areas as the print shop, carpenter shop, mailrooms, and the computer and data processing installations as well as in other areas in which teletype machines, paper bursting equipment, and other noise producing equipment are used. Ninety-five percent of this program is being conducted within the SSA headquarters, with the remaining five percent in their nationwide field operations.

The SSA does not have personnel assigned full-time to the hearing conservation program. These activities are jointly conducted by the various staff functions and the professional personnel working for the Office of Administration. Since the noise activities are on an as-needed basis, there is no breakdown of salaries or resources allocated for corrective measures. Expenditures and allocations are on a day-to-day basis and include audiometric testing equipment, sound level meters both area and personal, and noise attenuation efforts in the areas of greatest noise level exposures.

Noise Abatement

The only reported noise abatement activity was that of the Food and Drug Administration, which is discussed subsequently. In response to an EPA request for an indication of noise problems at Federal facilities in conjunction with Executive Order 11752, the HEW Office of the Secretary identified potential over-the-fence and work area noise problems at the Agency hopsital and laboratory facilities. Potential sources of community noise include power plant equipment and operations; air-operated, combustion-engine powered, and ground maintenance equipment used in construction activities; alarms, sirens and other alerting devices; and snowmobiles and outboard motorboats used for travel in Alaska. Potential work area noise problems include ventilating fans, pumps, compressors, alerting devices, and equipment used in maintenance shops, laundries, laboratories, kitchens, offices and machine rooms. The Agency reported no citation or warnings for noncompliance with applicable noise regulations nor any known uncorrected noise problems.

Food and Drug Administration (FDA)

FDA reported no over-the-fence or community noise problems. Internally, however, noise abatement has been applied to Data Processing units in the various components of FDA. Isolation, acoustical tile, and carpeting are the techniques used to reduce noise levels in these units. Funding is available through Maintenance, Alteration, Repair projects.

FDA estimates the cost of noise-related work as $2,000 for FY72, $17,000 for FY73 and $6,000 for FY74. These funds were primarily contractual funds for noise abatement of data processing units.

Technical Assistance

The only reported technical assistance activity in HEW was a training program conducted by the Division of Training of the National Institute for Occupational Safety and Health (NIOSH). Under the authority of the Occupational Safety and Health Act of 1970, NIOSH conducts short training courses in methodology for combating occupational health problems, including occupational noise, and disseminates educational materials related to all phases of occupational health. Although specialized courses in noise were offered in the past, these have been discontinued due to the availability of such training from the private sector. Occupational noise is included as a prominent topic within industrial hygiene courses offered in FY74 and FY75. State employees, along with those of Federal agencies and private industry, attend the courses. Although fees are charged to cover operating expenses, fiscal information for training could not be reported due to budgetary procedures.

Although not strictly a technical assistance activity as defined in this report, assistance on occupational hazards or health problems in response to requests from Federal agencies, is provided by the Division of Technical Services of NIOSH. NIOSH technical services usually take the form of a survey of the identified hazard and any other hazards or occupational health problems that might be present in the working environment and include recommendations on possible hazard control measures. During the last two years the Division of Technical Services has performed noise surveys in approximately 25 factories and worksites of which about half were Federal government installations. However, in only one of these cases was noise the only problem that prompted the survey. This total does not include numerous informal noise surveys that are performed by personnel from the NIOSH regional offices throughout the country.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

A major mandate from the Housing and Urban Development Act of 1949 is the goal of a "suitable living environment for American families". This mandate was reenforced in the Department of Housing and Urban Development Act of 1965 (P.L. 89-174). The latter Act sets forth as a matter of national purpose, the sound development of the Nation's communities and metropolitan areas.

Noise is a major source of environmental pollution that represents a threat to the serenity and quality of life in population centers. It is an objective of HUD, therefore, to encourage the control of noise through land utilization patterns that will separate uncontrollable noise sources from residential and other noise-sensitive areas. The HUD program is designed to foster noise responsive land use patterns by regulating HUD assisted developments although these constitute only a small percentage of total housing and community development activity. Direct control over development is supplemented by providing HUD standards, information and guidelines for use by other agencies and groups. HUD noise related activities combine research, standards, and technical assistance elements to implement this general policy.

Standards and Regulations

HUD Circular 1390.2, *Noise Abatement and Control: Departmental Policy, Implementation Responsibilities and Standards*, of August 1971 established the policy for the conduct of the departmental noise control activities. The policy promulgated minimum standards. HUD seeks to foster the creation of controls and standards for community noise abatement and control by general purpose agencies of state and local governments. The mechanisms used to implement this general policy are discussed under noise abatement. Additionally, the HUD general policy is to promulgate minimum standards and guidelines with respect to noise abatement and control, to utilize these as a uniform national policy to guide HUD program decisions, and to support existing state and local policies and standards.

The HUD circular establishes interim standards for new construction in three categories:

1. External noise exposures
2. Interior noise exposures
3. Insulation between dwelling units.

HUD external noise exposure standards for new construction sites are specified for both general areas and airport environs and are shown in Table C-1. For airport environs, the Composite Noise Rating (CNR) and Noise Exposure Forecast (NEF) measurement methodologies are used.

The interim HUD performance standards for interior noise exposures (for new and rehabilitated residential construction) are applicable to sleeping quarters. The circular specifies that existing and projected noise exposure for sleeping quarters is "acceptable" if interior noise levels

- Do not exceed 55 dBA for more than an accumulation of 60 minutes in any 24-hour period.
- Do not exceed 45 dBA for more than 30 minutes during night time sleeping hours from 11 p.m. to 7 a.m.
- Do not exceed 45 dBA for more than an accumulation of eight hours in any 24-hour day.

For insulation between dwelling units, the HUD circular stipulates that for multifamily structures, including attached single family units, floors and dividing walls between dwelling units having Sound Transmission Class (STC) of less than 45 are always unacceptable.

In applying the above standards, the circular directs that HUD personnel are to be guided by "a desire to prevent noise problems from coming into being and by an overall philosophy of encouraging the control of noise at its source." HUD personnel are to encourage use of the A-95 notification and review processes to detect potential noise problems as early as possible.

TABLE C-1

HUD EXTERNAL NOISE EXPOSURE STANDARDS FOR NEW CONSTRUCTION SITES*

General External Exposures	*Airport Environs*	
dBA	*CNR Zone*	*NEF Zone*
Unacceptable Exceeds 80 dBA 60 minutes per 24 hours Exceeds 75 dBA 8 hours per 24 hours	3	C
(Exceptions are strongly discouraged and require a 102 (2) C environmental statement and the Secretary's approval)		
Discretionary – Normally Unacceptable Exceeds 65 dBA 8 hours per 24 hours Loud repetitive sounds on site	2	B
(Approvals require noise attenuation measures, the Regional Administrator's concurrence and a 102 (2) C environmental statement)		
Discretionary – Normally Acceptable Does not exceed 65 dBA more than 8 hours per 24 hours		
Acceptable Does not exceed 45 dBA more than 30 minutes per 24 hours	1	A

*Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries.

Noise Abatement

The responsibility for implementing the HUD noise program rests with the Office of Environmental Quality, under the Assistant Secretary for Community Planning and Development. The Office of Environmental Quality is responsible for the implementation of all HUD environmental policies, including those under the National Environmental Policy Act (NEPA). Research support for this effort is the responsibility of the Office of Research and Development under the Assistant Secretary for Policy Development and Research. Day-to-day implementing responsibility for the noise program rests with the 10 HUD regional offices and 77 area and insuring offices.

Major HUD noise abatement activities are:

- *New Construction and Substantial Rehabilitation.* HUD assistance is not granted for housing projects with unacceptable noise exposure, and when granted in marginal cases, noise attenuation measures are required. This policy also covers assistance to college housing, group practice facilities, non-profit hospitals and nursing homes. Acceptability is determined in accordance with HUD exterior and interior noise standards contained in HUD Circular 1390.2, the provisions of which are delineated under Standards and Regulations.
- *Existing Construction.* Environmental noise exposure is a factor in determining the amounts of insurance and other assistance. Within cost limitations, HUD encourages the use of funds for modernization of buildings in noisy environments when such efforts will improve the noise exposure level.
- *Acoustical Privacy in Multifamily Dwellings.* HUD encourages the use of building design and acoustical treatment to afford acoustical privacy in multifamily dwellings, by establishing minimum requirements for all HUD assisted projects, and by providing information and manuals to private and public bodies.
- *Planning Assistance.* HUD requires that noise exposure be given adequate consideration in all planning activity receiving HUD assistance. This provides assurance that new housing, and other noise sensitive accommodations will not be planned for areas whose current or projected noise levels exceed HUD standards. HUD places particular emphasis on compatible land use planning in relation to airports and other sources of high-noise; HUD allows the use of planning funds to explore appropriate methods of reducing noise, for reconnaissance studies and studies in depth of specific noise control problems. Specific examples of such planning assistance projects are discussed under technical assistance.
- *Information and Guidance.* HUD maintains an active program designed to provide up-to-date information and manuals on noise abatement techniques to public and private bodies. It also provides information and manuals on improved methods for anticipating the encroachment of higher noise levels and the means to deal with this encroachment. Through these, HUD attempts to foster a better understanding of the consequences of noise. The approximate yearly man-hour cost for implementing HUD noise abatement policy at headquarters and regional area and insuring offices is between $150,000 and $200,000.

Technical Assistance

The two primary mechanisms (regulation of HUD assisted projects through HUD standards and provision of information and guidelines to other governmental agencies and organizations) used to implement HUD noise policy incorporate technical assistance projects.

HUD requires that noise exposure be given adequate consideration in all planning activity receiving HUD assistance. In addition, HUD planning funds have been used for noise related land use planning studies. In one such study conducted by the Tri-State Planning Commission, noise contours were established around selected airports in the Tri-State region and served as the basis for planning activity. The Metropolitan Washington Council of Governments has recently announced the initiation of a comprehensive areawide environmental noise study designed to assist local governments in identifying and controlling noise. The $22,500 first phase is being funded by HUD and local government contributions. The principal objective of the initial effort is to evaluate and recommend noise standards, for sources and environments not preempted by state or Federal regulations.

HUD reported that its standards, as well as information and guidance manuals issued by HUD, have received wide acceptance, and their influence has been pervasive. It is an established position at HUD that noise can be described in terms understandable and useable by nontechnical persons in all levels of government and by the general citizenry. HUD techniques for noise assessment, noise attenuation, and general guidelines for planning developments around noise generators have been extensively used by other agencies and groups. For example, over 15,000 copies of the HUD Noise Assessment Guidelines have been sold by the Government Printing Office. HUD is currently developing an informational document entitled "Handbook on Community Environmental Noise" for which $59,000 was spent in FY71 to 73 and approximately $9,000 for FY74.

DEPARTMENT OF THE INTERIOR (DOI)

This Department's activities fall into the categories of standards and regulations, hearing conservation, and noise abatement.

Standards and Regulations

In the Department of the Interior, the Bureau of Mines had amended in 1970 the regulations of the Federal Coal Mine Health and Safety Act of 1969 to include the OSHA noise standard prescribed under the Walsh-Healy Public Contracts Act.* A new Part 70 to Title 30 CFR, Chapter 1, Subchapter 0, to the Act incorporates in paragraph 70.500 the OSHA standard as applicable to each coal mine and each operator of such mine for compliance effective June 30, 1970. In 1972, the same noise standard was promulgated for surface work areas of underground coal mines and for surface coal mines by a new Part 71 for the aforementioned Federal Coal Mine Health and Safety Act. The latter provision became effective within 90 days after its promulgation on March 22, 1972.

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*For the OSHA standard and the EPA position on that standard, see the discussion under Department of Labor

Both of the above actions (for underground coal mines and surface work areas) were taken before passage of the NCA and before completion of the EPA research programs expanded by, or begun under, the new directives and authorizations of the NCA. This was particularly true for protection against noise in the work place and in regard to hearing conservation programs. Then EPA developed specific new positions on modifications in the OSHA noise standard as promulgated by the Department of Labor. Thereafter, when other agencies have proposed regulations that incorporate the OSHA occupational noise exposure standard, EPA has utilized its coordination authority to assure that its concerns and recommended modifications are adequately addressed.

For mine safety, the DOI position came under scrutiny with release by the Bureau of Mines of an NPRM of August 29, 1973 (38 FR 23383-88) for adoption of the OSHA noise control standard as mandatory for metal and non-metallic open-pit mines; sand, gravel, and crushed stone operations; and metal and non-metallic underground mines. There was an extensive interagency review of the proposed standard. EPA expressed the desire that the new standards conform more closely with

1. Current EPA noise exposure recommendations, including lower exposure levels and a complete hearing conservation program.
2. The current revision of the Occupational Safety and Health Administration Noise Standard being considered by the Department of Labor.

Since a noise standard did not yet exist for the metal and non-metal mining industries, and rather than delay promulgation of the mandatory new standards altogether, EPA concurred in the promulgation and enforcement of the standards as proposed subject to assurance that the Department would promptly present to the Federal Metal and Non-Metal Mine Safety Advisory Committee the revisions proposed by EPA under Section 4 of the NCA. With the latter provision duly noted by publication in the *Federal Register*, the metal and non-metal mine noise standard was issued by the Department on August 2, 1974, to take effect on August 7, 1974 as paragraphs 55.5, 56.5, and 57.5, respectively, of Subchapter N, Chapter I, Title 30 CFR (39 FR 28433-4, August 7, 1974).

Hearing Conservation

Hearing conservation programs have been reported by nine components in the Department:

Bureau of Mines
Geological Survey
Mining Enforcement and Safety Administration
Bureau of Land Management
National Park Service
Bonneville Power Administration
Alaska Power Administration
Bureau of Reclamation
Bureau of Indian Affairs.

The programs vary considerably due to differences in the nature of noise exposure problems arising from the operations engaged in by the respective bureaus and offices. The Bureau of Reclamation and the Bonneville Power Administration both conduct extensive hearing conservation programs. The others are smaller in scope. A Department-wide safety handbook is in preparation. When completed it will provide a basis for standardization of hearing conservation programs throughout the Department.

The following paragraphs provide a summary of the descriptions provided to EPA of hearing conservation programs in the Department.

Bureau of Mines

The Bureau of Mines reportedly does not have any serious noise exposure problems. There have been no hearing disability claims submitted by Bureau employees. Emphasis is on the audiometric screening of employees and a continuing program of noise surveys to ensure compliance with OSHA standards. The primary sources of noise are those encountered in the research and testing of methods for improved production methods.

Mining Enforcement and Safety Administration (MESA)

MESA was recently created from several former components of the Bureau of Mines, including the Division of Coal Mine Health and Safety. MESA therefore has acquired responsibility for the enforcement of the occupational noise exposure standards discussed above under Standards and Regulations (including noise standards for underground coal mines, promulgated July 7, 1971 in accordance with the provisions of section 206 of the Federal

Coal Mine Health and Safety Act of 1969 and those for metal and nonmetallic mines promulgated August 7, 1974.

The enforcement of standards requires more than 1,000 field inspectors. Part of their inspection duties is to investigate and evaluate the miners' exposure to noise. These duties therefore result in the exposure to noise of the inspectors themselves. Due to its recent formation MESA is still following the policies and regulations pertaining to noise as set forth in the Bureau of Mines manuals.

Geological Survey

The hearing conservation program at Geological Survey has been in effect for one year. Immediate objectives are

1. To establish hearing baseline data for all employees exposed to levels above 85 dBA
2. To establish noise reduction programs for specific equipment.

Primary sources of noise include printing equipment, helicopters, computers, and shop operations. No data is available on hearing loss claims. Audiometry equipment has been acquired and will facilitate the testing of employee hearing. A study has been made of noise levels associated with offshore oil and gas production platforms. High noise levels up to 105 dB are found in the operation of various equipment. Noise abatement methods include the use of engine mufflers, sound-absorbing enclosures, insulation of crew quarters, and the use of personal protection. USGS reported a FY74 expenditure of $8,000 for hearing conservation programs: approximately $3,000 for audiometric testing equipment and $5,000 for acoustical material to quiet the computer room. It is planned that an additional $78,000 will be expended in the next two years for the quieting of shop areas.

Bureau of Land Management (BLM)

The BLM hearing conservation program is monitored by Bureau headquarters, and the responsibility for implementation of the program rests with the directors of the various field activities (e.g., state directors). Management policy and guidance regarding hearing conservation is provided via appropriate directives. Three features of particular significance in the program directive are:

1. The emphasis placed upon the use of properly trained personnel in the conduct of noise surveys
2. The requirement to retain records of noise surveys for the purpose of review and analysis

3. The requirement to obtain the services of "a recognized audiologist" to administer audiometric testing and to review audiograms.

Noise exposure in the BLM occurs in connection with the operation of heavy equipment (graders, caterpillars), fire fighting pumps, chain saws, aircraft operations and some small machine tool or woodworking equipment.

Problems tending to limit effectiveness of the program include: unavailability of monitoring equipment, lack of trained personnel to conduct surveys, the high cost of audiologist services, and the assignment of responsibility for the implementation of the hearing conservation program to individuals with other primary duties. Thus, it would appear that, due primarily to funding limitations, the program may not be as effective as it could be with adequate resources.

In response to a headquarters directive requiring review by field activities of the need for personal protective equipment, the following items were obtained with respect to hearing protection.

- State Director, Alaska, reported that they have only recently acquired the capability to measure noise levels. In the meantime hearing protectors are used in noisy areas.
- Several locations reported the need for additional ear protectors.
- In general, noise meters seem to be in short supply at state and district offices. One state reported that no noise survey has been made.

National Park Service

Employees of the National Park Service are exposed to noise from a variety of sources: power plants, aircraft, boats, trucks, blasting, motor vehicle, air compressors, heavy equipment, power toois, machines, motors, and firearms. A management directive, consistent with OSHA standards, has been issued identifying maximum permissible exposures to noise. Noise surveys have not yet been conducted, but an organization-wide survey is planned for the near future to identify all areas that require attention. Hearing conservation activities are limited by manpower shortages and funding constraints.

Bonneville Power Administration (BPA)

Noise associated with the BPA program can be divided into two basic categories – noise from construction and maintenance equipment, and noise from transmission facilities. Most noise exposure problems are associated with construction operation. The noise associated with power transmission is not high enough to constitute a hazard to hearing, consisting of the low-level hum from substation equipment and the corona noise of high voltage transmission lines. However, in the case of a (very infrequent) circuit failure, operation of the power circuit breakers can produce a noise pulse of up to 100 dB at the substation property line.

The most prevalent source of construction noise is that from earth-moving equipment – excavating machinery (backhoes, bulldozers, etc.) and road building equipment (compactors, scrapers, graders, etc.). Both BPA and its contractors adhere to OSHA standards. BPA operations create working environments in excess of OSHA standards except chipper operations for clearing of right-of-way for transmission lines. Hearing protectors are mandatory around such operations. Levels between 80 and 87 dB were found in printing shops and in the computer center. Corrective action was taken to reduce these noise levels. Noise surveys have been conducted for all jobs and noise producing facilities throughout BPA.

An audiometric testing program was instituted in August 1974. The objective is to establish baseline hearing levels of employees to be followed by annual tests. Therefore, records on the incidence of hearing loss have not been available in the past but will be in the future. The records will be used for various purposes, including:

- The identification of work areas in which hearing losses are being sustained.
- Use as a reference for determining if accident potential is associated with hearing deficiencies.
- Use as a guide for management in making administrative decisions regarding exposure.

Expenditures for hearing conservation programs are estimated at $1,200 in FY74 and $4,000 in FY75.

Bureau of Indian Affairs (BIA)

Although the BIA does not operate a formal hearing conservation program it has informally encouraged hearing conservation for more than ten years. Noise surveys have been taken and instruction provided on the use of ear protection devices. Major sources of noise encountered in BIA activities include heavy construction equipment, shop tools, chain saws, and, in the Forestry Branch, snowmobiles. Audiometric testing is not done and there are no records on hearing disabilities.

Alaska Power Administration (APA)

The main source of noise in APA operations is that stemming from the hydroelectric generating process (interaction of water and turbines). Sound level measuring equipment is being procured so that hazardous areas may be identified. An audiometric testing program is being planned. Presently, personnel are required to wear ear muffs in areas deemed "noisy."

Bureau of Reclamation

The hearing conservation program at Reclamation is fully operational and is managed by the regional offices with overall supervision by the Chief Safety Engineer. Technical assistance is provided by the Engineering and Research Center. Since 1968 over 5,000 sound level or octaveband analysis readings have been made in Bureau-operated facilities on Bureau-administered construction projects, and on or near contractor and Bureau heavy equipment.

Each Region has obtained sound level and octave band noise analyzing equipment, audiometric examination and calibration equipment, and certified technicians to conduct audiometric examinations and noise surveys. They have also contracted for the services of an audiologist or an otologist as a hearing conservation consultant, identified and posted locations with proper signs where high-noise levels are generated, obtained hearing protection equipment, developed educational use programs, and started to obtain baseline audiograms on all employees exposed to noise levels exceeding the recommended levels. In addition, employees found to have a significant hearing loss are being referred to their private physicians for consultation and additional examinations. Should followup or annual audiograms on referred employees indicate further losses, personnel actions are requested.

To date, excluding heavy equipment, 288 locations exceeding the 85 dBA limit have been identified. Upon identification of such areas, employees are informed of the hazard, and proper protective measures are initiated until further analysis can determine if sound level reductions can be obtained. Studies have indicated that most operators of heavy equipment are exposed to noise levels in excess of the threshold limit values, and personal protective devices should be worn during operational periods.

Table C-2 provides a list of locations where equipment exceeds 85 dBA. Generally, employees in the locations shown or adjacent to or on the equipment listed were exposed to noise levels above 85 dBA. No attempt was made to show actual noise levels as they varied considerably depending on type of work involved, number of pieces of equipment operating, and distance between employee and equipment. Also, there are other unlisted specific operations or locations in which the noise levels exceeded 85 dBA during short intervals with no employee exposure. Since 1968 there have been 14 claims of hearing loss, 13 from sustained noise exposure and one from concussion.

TABLE C-2

BUREAU OF RECLAMATION GENERAL LOCATION AND EQUIPMENT EXCEEDING 85 dBA NOISE LEVELS

Location

Powerplants

- Turbine pits
- Turbine rooms
- Generator rooms or floors
- Penstock galleries
- Pipe galleries
- Shop areas (near grinders' workbenches)
- Heat pumps
- Oil filter rooms
- Unwatering galleries

Pumping Plants

- Control floors
- Operating floors

Dredges

Adjacent to:
- Discharge pumps
- Generators
- Grinding wheels
- Air compressors
- Auxiliary engines
- Light plants

Construction Sites

Underground:
- Tunneling – conventional
- Tunneling – Rapid excavation machine
- Concrete lining operations
- Grouting or shotcrete operations
- Diesel engines
- Ventilation fans
- Drilling

Above ground:
- Drilling
- Vibrating and compacting
- Compressor houses
- Borrow and fill areas

Heavy Construction Equipment

- Crawler tractors
- Road graders
- Self-propelled scrapers
- Compactors
- Industrial-type tractors
- Gradalls
- Draglines
- Front-end loaders

Miscellaneous Construction and Maintenance Equipment

- Air drills, jackhammers
- Power saws
- Arc-air welding
- Grinding

BR has identified the need for additional trained personnel to conduct sound surveys and audiometric exams. This shortage is directly attributable to a lack of funds.

The program is operational throughout the Reclamation area with hundreds of persons involved. Approximately 25 are professionals and the remainder sub-professionals.

Noise Abatement

Major noise abatement activities were reported by both the Bonneville Power Administration (BPA) and the Bureau of Reclamation (BR). The National Park Service also reported a requirement for mufflers on snowmobiles and motor vehicles which are operated within park areas.

Bonneville Power Administration (BPA)

BPA is concerned with over-the-fence noise in its design, engineering, and operations activities and in its construction projects. It also endeavors to reduce workplace noise. For example, audio noise generated by communications facilities can be distracting to power systems operations and maintenance personnel. Such distractions pose serious problems for operations requiring strict attention. Accordingly, design specifications have been issued to limit audio noise. Noise is an important consideration in the design of BPA facilities and in the selection of sites, limited only by technical and economic feasibility. Established BPA practice is to meet or exceed industry standards on acceptable levels of noise (National Electrical Manufacturer's Association Standards). With respect to construction noise, BPA contracts specify, as necessary, the kinds of noise abatement measures that are to be implemented. Standard specifications for noise control in construction projects have been issued.

BPA locates its new substations so as to minimize noise impact on neighboring areas. That is, adequate space is provided between the substation and existing residential, commercial, and industrial buildings to reduce ambient noise levels. Transformers (a major source of substation noise) are purchased which are the quietest available, and they exceed industry standards with respect to noise emissions.

In addition, BPA is currently designing many of its 500-KV transmission lines with triple bunting conductors. In at least one instance BPA has reconductored a line with triple bunting conductors specifically to reduce noise. This design modification greatly reduces audible noise and increases line carrying capacity, all at a significant increase in cost over single conductor lines.

Funding for noise abatement programs is included as part of the annual budget. The costs directly attributable to noise abatement are currently about \$2.5 million per year and are expected to rise in proportion to the general budget increases. It is important to note that the cost of noise abatement is ultimately borne by BPA customers.

BPA also is developing an environmental training program for its personnel. Among the topics to be covered are the problems of noise and noise abatement. Total funding required for the program is \$150,000.

Bureau of Reclamation

The Bureau of Reclamation report on their noise abatement activities indicates that they have a well organized and aggressive effort to control both their inhouse and over-the-fence noise problems. Noise abatement activity is considered to be one of their regular design, planning, and operating functions. Although personnel are not organizationally assigned to the noise control function (with the exception of one staff acoustical engineer), a number of the Bureau's personnel have received special noise control training and are available to work on noise problems as they arise. Responsibility for noise control programs rests with Regional Directors. Technical assistance is provided by the Engineering and Research Center.

The Bureau has for some time recognized that specific noise control measures can be incorporated in the project design stage. This is now routinely handled by designers in the 15-man Structural and Architectural Branch of the Engineering and Research Center at Denver, Colorado. Because noise is inherent in some equipment, reduction of its effect is now incorporated in the layout and designs of new facilities. Previously, other considerations distorted facility design and resulted in high-noise environments. For example, at one power plant a study revealed a cost saving if the turbine runner could be removed from below the turbine distributor rather than up through the generator. This arrangement precluded encasement of the turbine draft tube cone and required large open passageways from the draft tube area to other areas of the plant, resulting in considerably more noise in the plant than from the usual installation. Future cost studies for installations include provisions for noise abatement to alleviate problems such as this.

The following are some of the noise alleviating design solutions being used by the Bureau.

- Isolating objectionable noise-producing equipment by distance, if practicable, or by sound retarding barriers. An example is locating the air compressors in a room some distance away from where personnel are normally stationed and, where possible, setting compressors on foundation slabs rather than intermediate floor slabs.

- Avoiding straight open corridors from sources of noise to areas normally occupied by personnel. For example, in power plants where the control room is on the same level as the access to the turbine pits, the access passages are oriented to direct noise away from the control room. At unattended facilities, plant operation is controlled from a remote station by supervisory control equipment. This type of operation reduces the noise problem to a sound-retarded communication booth.
- Providing for future additional measures at minimum cost, if found necessary. A practice now in use is to size openings to permit a future installation of standard size sound-retarding doors.
- Substituting concrete bearing wall enclosures for beam and column construction.
- Completely encasing turbine spiral cases in installations where partial encasement has been used in the past. Complete encasement is somewhat more costly in that additional plant height is required and more concrete is used.
- Isolation of pumping units where pump encasement is not possible. Isolation can be affected by utilization of sound-retarding walls and doors between pumping units. Isolation is also indicated for impulse wheels.

DEPARTMENT OF JUSTICE (DOJ)

This Department reported conducting hearing conservation activities.

Hearing Conservation

The Department of Justice reported on hearing conservation activities within certain institutions under the jurisdiction of the Bureau of Prisons. The Bureau has general supervision over the operation of more than 30 Federal correctional institutions. Hearing conservation programs, including audiometric testing, have been established in four institutions where the highest noise levels exist. In addition, noise surveys have been conducted in other facilities to assess the need for hearing conservation programs.

The four institutions with established hearing conservation programs are the U.S. penitentiaries at Atlanta, Georgia; Terre Haute, Indiana; Lewisburg, Pennsylvania; and Leavenworth, Kansas. The programs include audiometric testing of all inmates presently assigned to high noise level areas and of all inmates prior to assigning them to an industrial program. The Bureau plans that this program will be used to test all inmates and civil service personnel as part of their entrance physicals to establish hearing baselines. Audiometric testing equipment and sound level meters have been purchased at an approximate cost of $6,000 per institution. The hearing conservation programs, which are under the direction of the Safety Officer and Medical Department of each facility, encompass noise surveys to identify problem areas, engineering corrective measures, and use of hearing protection in areas where engineering measures cannot lower the noise to an acceptable level and where it has been determined that the area be designated a 100-percent hearing protection area. The Bureau recognizes that in the past, employee and inmate attitudes towards ear protectors have limited the effectiveness of the programs. The Bureau has instituted administrative procedures to strengthen the enforcement of mandatory hearing protection.

The Department of Justice reported that almost all bureau facilities had been surveyed to identify noise exposure problems; these surveys were conducted by NIOSH, OSHA, state health departments, or Bureau Safety personnel. Noise survey reports of six facilities were submitted. Noise levels significantly above 90 dBA were measured in five of the six facilities, only one of which (U.S. Penitentiary at Terre Haute, Indiana) has an established hearing conservation program. The Bureau stated, however, that corrective measures have been taken or the individuals exposed to excessive noise in these facilities have been provided with hearing protection.

The primary noise generating operations in the Bureau of Prisons are textile mills, metal factories, wood furniture manufacturing, carpenter shops, and power plants. The Bureau stated that most, if not all, areas in excess of 90 dB have been identified and engineering controls, supplemented by mandatory hearing protection, have been instituted. In addition to the equipment mentioned above, the Bureau has purchased a sound level meter, and at least two other facilities have sound level meters. Bureau employees have attended National Safety Council courses on industrial noise and audiometric testing.

Two disability claims for hearing loss were reported. The first was a civil service, power plant engineer who sustained a 61-percent hearing loss and was awarded $28,731. The other was an inmate who was assigned to a drilling and dynamite blasting crew on a road project.

Information was not provided to indicate total funding or personnel involved in hearing conservation programs.

DEPARTMENT OF LABOR (DOL)

Reported activities may be divided into standards and regulations and hearing conservation.

Standards and Regulations

Federal efforts to effectively regulate occupational noise in the United States were begun about 1955. Under the Walsh-Healey Public Contracts Act of 1936, as amended, safety and health standards were issued that contained references to excessive noise, but they prescribed neither exposure limits nor acknowledged the problem of noise-induced occupational hearing loss. A regulation (41 CFR 50-204.10) promulgated in 1969 under this act, stipulated noise limits for occupational exposure for hearing conservation purposes. These limits were only applicable to those firms having supply contracts with the Federal government in excess of $10,000. Under the Service Contract Act, similar limits were made applicable to work under Federal Service contracts of $2,500 or more.

The present legislation governing occupational noise exposure is the Occupational Safety and Health Act of 1970, which authorizes the Secretary of Labor to set mandatory occupational safety and health standards applicable to businesses affecting interstate commerce. Section 19 of the Act extends this protection to Federal employees. The Act established the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education and Welfare which was charged with developing criteria, on the basis of available evidence, for harmful physical agents that describe exposure levels safe for various periods of employment. An occupational noise exposure standard was promulgated by the Department of Labor on May 29, 1971, and on August 14, 1972, NIOSH submitted to the Department of Labor criteria for a recommended occupational noise exposure standard. In addition, on October 24, 1974, DOL published in the *Federal Register* the proposed revision to its standard.

The Occupational Safety and Health Act requires that the Department of Labor in promulgating a standard ". . . shall set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity . . .". EPA, having a primary obligation under the Noise Control Act is to protect the public health and welfare from the adverse effects of noise and, empowered under Section 4(c)(2) of the Act to review Federal noise standards and regulations, believes that the proposed DOL standard does not fulfill the stipulated requirements of the Occupational Safety and Health Act and that it does not protect the public health and welfare to the extent required and feasible. The basis for the EPA assessment that the proposed standard is inadequate and for EPA's recommendations for a more protective standard is the data on the effects of noise published in the EPA "Levels Document". EPA has identified a yearly equivalent sound level of 70 dBA averaged over a 24-hour period as the safe level for protection against hearing loss. The

70 dBA level would be compatible with an 8-hour exposure level of 75 dBA, so long as the exposure level over the remaining 16 hours is sufficiently low to result in a negligible contribution to the 24-hour average. Although the identified safe level is not a standard but rather a long-range public health goal, it provides a basis for judgment in the setting of standards.

Table C-3 summarizes those provisions of the existing DOL occupational noise exposure standard, its proposed revision, and those recommended by NIOSH and EPA which form the primary areas of disagreement between DOL and EPA.

In advocating a more stringent 85 dBA, 8-hour exposure limit, EPA has recommended that this limit become effective within 3 years with a commitment to reduce to lower levels at a later date when such a reduction is shown to be feasible. EPA has made several additional suggestions aimed at ameliorating the economic impact of a more protective standard as part of EPA efforts to work with DOL in the development of the standard. In the EPA view, its concerns and recommendations have not been adequately addressed by DOL. Therefore, EPA has resorted to the procedures of Section 4(c)(2) of the Noise Control Act by publishing in the *Federal Register* on December 18, 1974, a request for a formal review and report on the proposed standard. In view of the severity and immediacy of the problem of noise-induced occupational hearing loss, EPA believes that an occupational noise exposure standard based on the best available evidence of the effects of noise and protective of the public health and welfare is essential.

TABLE C-3
SUMMARY OF SIGNIFICANT PROVISIONS OF OCCUPATIONAL
NOISE EXPOSURE STANDARDS

Provision	*Existing DOL*	*Proposed DOL*	*NIOSH Recommended*	*EPA Recommended*
8-Hour Exposure Limit to Steady State Noise (dBA)	90	90	85	85
Time/Intensity Trading Ratio (dB)	5	5	5	3
Steady State Noise Ceiling (dBA)	115	115	115	100

The Occupational Safety and Health Act incorporates a mechanism by which the primary responsibility for the administration and enforcement of occupational safety and health regulations may be transferred to the states. The Act includes a grant provision to encourage states to assume this responsibility. Even after the approval and operation of a state plan, the Secretary of Labor retains jurisdiction over elements of the program and is required to undertake a continuing monitoring function.

As of September 1974, 25 states had OSHA-approved plans (including the noise-exposure limitation provision) and 19 state plans were undergoing review by the U.S. Department of Labor. All but four of the latter were plans developed by states under general constitutional authority rather than pursuant to specific enabling legislation. It may be inferred that the absence of such specific legislation may require careful determination to assure that the (administrative) implementation of the proposed plan will not be legislatively challenged and be supported by adequate appropriations. Five states and the trust territories have not yet submitted plans to OSHA; five states have withdrawn plans previously submitted for OSHA review and approval, and one state plan has been rejected by OSHA.

Hearing Conservation

The Department of Labor hearing conservation program is incorporated into the Department-wide Employee Safety and Health Program which is now under internal review and is expected to be strengthened and expanded considerably in the future. Chapter 5-300 of the Manual of Administration spells out the organization, program components, and assignments or responsibility for the Employee Safety and Health Program which is consistent with Section 19 of the Occupational Safety and Health Act of 1970 and Executive Order 11612. A prime objective is employee accident prevention. Essential program features include an extensive accident reporting and recording system, promotion of, and training for, improved employee safety and health habits, and establishment of, and participation on, various safety councils and committees. The administrative manual sets out a tiered system of interlocking responsibilities for program development and implementation. This ranges from responsibility for overall direction of the program, which is vested in the Assistant Secretary for Administration and Management and which is carried out by a designated Department Employee Safety and Health Director, to day-to-day program implementation by managers and supervisors.

An internal DOL directive on the Occupational Health Program establishes procedures and guidance applicable to the DOL hearing conservation program. Noise exposure criteria used are consistent with OSHA requirements; noise levels considered potentially hazardous are 90 dBA for steady state noise and instantaneous peak value in excess of 140 decibels for impulse noise. The directive provides general guidance for noise surveys, engineering controls, audiometry, and use of hearing protective devices.

Noise Surveys

The directive emphasizes that noise surveys including octave band analyses and consideration of exposure time, and conducted by trained personnel, are essential for determination of potentially hazardous noise exposure. Noise surveys are a part of every facility inspection and program evaluation conducted annually at all DOL organizations and facilities. The Department stated that the printing shop, graphic arts shop, and warehouse were industrial operations with high noise levels. In addition, DOL compliance officers in the course of their duties may be exposed to hazardous noise levels.

Engineering Controls

The directive states that whenever operations permit, exposures to potentially hazardous noise will be eliminated or reduced to the maximum extent possible by engineering or operational controls.

Audiometry

Prior to job placement or transfer to work assignments involving exposure to potentially hazardous noise levels, employees are to receive baseline audiometric tests which will be made a permanent part of health records. Data on the incidence of hearing losses or number of hearing disability claims are presently unavailable as the program was not established until January 1, 1974, and followup examinations will not be scheduled to start until 1975.

Use of Personal Protective Devices

Heads of agencies and regions are to ensure that personal protective equipment is worn whenever personnel are exposed to potentially hazardous noise levels and that a combination of ear plugs and ear muffs are worn for exposure to steady state noise of 120 decibels or more, if electronic communication systems are not involved. Trained personnel are required to identify areas where ear protectors are to be worn and to provide instruction in their use.

The Department indicated that no significant problems had arisen in connection with the program. Although the hearing conservation program is budgeted annually, no information on funding or personnel levels was provided.

DEPARTMENT OF STATE

This agency reported involvement in noise abatement activities.

Noise Abatement

The Department of State noise abatement efforts have been incorporated into its safety operations. This program consists primarily of maintaining liaison with operational units, the building manager, and the General Services Administration. The only reported activity was periodic checks of potential noise problem areas.

DEPARTMENT OF TRANSPORTATION (DOT)

This department reported activities in all four categories.

Standards and Regulations

The Department of Transportation Act of 1966 (40 U.S.C. 1653) directed the Secretary of Transportation to promote research and development relating to all aspects of transportation, including noise abatement with particular attention to aircraft noise. The Federal-Aid Highway Act of 1970 directed the Secretary of Transportation to promulgate environmental standards, including noise levels compatible with different land uses.

Federal Aviation Administration

The Federal Aviation Administration (FAA) addressed aircraft noise as early as 1960. After its transfer into the Department of Transportation, FAA was formally assigned control of aircraft noise and sonic boom by P.L. 90-411 in 1968, in Section 611, which amended the Federal Aviation Act of 1958. Further, the Airport and Airways Development Act of 1970 directed the FAA to abate airport noise in order to protect and enhance the natural resources and protect the quality of the environment.

The control and abatement of noise emissions from aircraft and of noise created by aircraft operations at and near (civilian) airports and the control of sonic boom are mandated by the provisions of NCA Section 7. NCA Section 3(3)(A) specifically excepted from the categories of "products" for which EPA was to develop noise standards

> "any aircraft, aircraft engine, propeller, or appliance, as such terms are defined in Section 101 of the Federal Aviation Act of 1958".

NCA Section 7(b) revised Section 611 of the Federal Aviation Act of 1958 (49 U.S.C. 1431) so as to leave FAA responsible for promulgation of actual regulations to control aircraft noise. However, the revision also specified the arrangements for the future interaction between EPA and FAA in defining and formulating aircraft noise abatement standards.

Regulations for aircraft and airport noise control prior to the NCA were specifically continued by the NCA revision of Section 611 of the Federal Aviation Act of 1958.

To date, the FAA has issued the following regulations dealing with aircraft noise and sonic boom:

1. Federal Aviation Regulations, Part 36, "Noise Standards: Aircraft Type Certification," effective December 1, 1969.
2. Amendment to FAR, Parts 21 and 36, "Noise Standards for Newly Produced Airplanes of Older Type Designs," October 19, 1973.
3. Amendment to FAR, Part 36, "Noise Type Certification and Acoustical Change Approvals," issued December 12, 1974.
4. Amendment to FAR, Parts 21 and 36, "Noise Standards for Propeller-Driven Small Airplanes," issued December 31, 1974.
5. Amendment to FAR, Part 91, "General Operating and Flight Rules Covering Civil Aircraft Sonic Boom," issued March 23, 1973.

To date, the FAA has also issued the following Advance Notices or Notices of Proposed Rule Making dealing with aircraft noise:

1. Approach and Landing: ANPRM 74-12;
2. Retrofit/Fleet Noise Level: ANPRM 70-44, 73-3, NPRM 74-14;
3. Supersonic Civil Aircraft: ANPRM 70-33;
4. Modifications to FAR, Part 36: NPRM 71-26;
5. Propeller-Driven Small Airplanes: NPRM 74-39;
6. Short-Haul Aircraft: ANPRM 73-32; and
7. Minimum Altitudes: NPRM 74-40.

Although not regulatory in nature, the FAA has also issued the following Advisory Circulars and FAA Orders dealing with aircraft noise control:

1. FAA Order 7110.22A, "Arrival and Departure Handling of High Performance Aircraft," issued February 28, 1972.

2. Advisory Circular 90-59, "Arrival and Departure Handling of High Performance Aircraft," issued February 28, 1972.
3. Advisory Circular 91-36, "VFR Flight Near Noise-Sensitive Areas," issued August 7, 1972.
4. Advisory Circular 91-39, "Recommended Noise Abatement Takeoff and Departure Procedures for Civil Turbojet Powered Airplanes," issued January 18, 1974.
5. Advisory Circular 91-36A, "VFR Flight Near Noise-Sensitive Areas (Revised)," issued July 9, 1974.

The EPA submissions of alternative rulemaking proposals to FAA are discussed subsequently. The relationships among the differing proposals advanced by the two agencies are shown in Table 4-3 in Section 4 of this report.

Federal Highway Administration

The Federal Highway Administration (FHWA), another constituent administration of DOT, has issued standards and procedures to control highway noise. The design of noise levels for Federally financed highways were specified in DOT/FHWA PPM 90-2, "Noise Standards and Procedures," which was issued first on April 26, 1972, and reissued on February 8, 1973, with clarifications and revisions. Projects that received location approval prior to July 1, 1972, are not required to adhere to the design standards provided design approval was obtained prior to July 1, 1974, although FHWA encourages application of the standards to such projects whenever possible. Location approval requests after December 31, 1972, require full compliance with the noise standards. Up to December 31, 1972, an analysis and report on noise was not required.

PPM 90-2 recognizes five land use categories, ranging from Category A with a 60 dBA exterior design Noise Level (L_{10}) for land where "serenity and quiet are of extraordinary significance and serve an important public need" (including parks and amphitheaters) through Category B with an exterior design noise level of 70 dBA for residences, hotels, public institutions, and active sports areas, to Category C for lands, properties and activities not included in A and B and capable of sustaining a 75 dBA noise level. Category D is essentially for handling land that is undeveloped at the time of approval and Category E is for locations of residences, hotels, hospitals and auditoriums in which an interior design noise level of 55 dBA can be achieved through appropriate protective and acoustical measures.

A component of the Federal Highway Administration, the Bureau of Motor Carrier Safety, promulgated in October 1974 a noise-exposure standard related to the type of work-place protection otherwise provided for in the previously cited OSHA noise control standard. The new paragraph 393.95 of the Motor Carrier Safety Regulations, established a maximum interior sound level for exposure of individuals in the cabs of commercial trucks and inside buses operated in interstate or foreign commerce of 88 dBA generated by the vehicle in a stationary test for any 10-hour period. The primary purpose of the regulation is to protect the hearing of drivers; it does not restrict the operation of the vehicle per se, but only brings the noise exposure of the driver into the levels and duration limits of the OSHA standard.

When the BMCS first proposed this regulation on January 4, 1973, EPA objected that the standard was inadequate since it represented, in effect, merely an extrapolation of the 8-hour/90 dBA levels to 10 hours of the OSHA standard to which EPA has objected as being inadequate. The EPA stand was based on

- The recommendation of several researchers that the OSHA limits should be set at 80 to 85 dBA for 8 hours' exposure.
- The possible additive effects from other stresses, such as vibration.

The EPA recommendation to BMCS in 1973 was a maximum in-cab noise level of 83 dBA over 10 hours. This was based on the extrapolation to 10 hours of an 8-hour/85 dBA noise level. EPA believes that the 85-dBA level would be a reasonable maximum in light of the criticism of the 90-dBA level and the possible vibration effects. Thus, although the 83-dBA maximum was based on health and welfare considerations, it was considered that there is reason to believe that stressors such as vibration and eye fatigue may combine with noise levels to slow reactions to light and sound stimuli, thereby reducing highway safety as well.

In September 1974, EPA again called the attention of BMCS to the effort to have OSHA lower the (work-place) exposure standard to 85 dBA. In fact, EPA suggested in the "Levels Document" to lower the level to 75 dBA for eight hours as adequate hearing protection. But this recommendation did not take into account considerations of cost and feasibility. Thus, on September 23, 1974, EPA requested, under the "review and report" authority of NCA Section 4, that BCMS enter into formal discussion with the EPA Office of Noise Abatement and Control to review the technology and feasibility to consider lowering the permissible in-cab level to 83 dBA for 10 hours. EPA linked this request to the proposal of a noise source standard for medium and heavy duty trucks that was formally issued on October 15, 1974, under Section 6 of the NCA. The new truck standard, EPA stated, would probably compel truck manufacturers to make basic design modifications in order to achieve the external noise level standards. This, it was held, would also make available the technological capability to ensure quieter in-cab levels. EPA called on BMCS to modify the in-cab standard so as to prescribe a lower level for the new trucks subject to the (proposed) EPA regulation.

U. S. Coast Guard

Unique but persistent sources of noise are the signal devices operated for mariners by the U.S. Coast Guard. Special Coast Guard instructions seek to provide for land-use measures to prevent harmful or annoying exposure of the public to the sound emission levels of the signals. Commandant Notice 11011, issued by DOT/USCG in August 1974 and effective through June 1, 1975, amends the *USCG Real Property Management Manual* (CG-262) to comply with NCA Section 4(a) to provide that measures are taken for protection from both "hearing damage" and "annoyance" by Coast Guard-operated sound signals. The Coast Guard regulation provides for land-use disposition of Federally controlled property and for collaboration with state and local planning and zoning authorities for property near Coast Guard-operated sound signals so as to minimize exposure or annoyance. The Coast Guard notice uses 60 dBA as its hearing conservation guideline for land-use planning. Sound Pressure Level (SPL) changes of 3 dBA are used as the criterion for "annoyance" since lower SPLs are not readily perceived by the human ear under non-laboratory conditions.

Hearing Conservation

The only reported hearing conservation program in DOT was that conducted by the U.S. Coast Guard (USCG).

USCG Safety Manual, CG-405, consolidates Agency safety policies with a specific chapter devoted to the hearing conservation program. All aspects of a fully operational program are specified, including an extensive audiometric testing program using trained personnel and certified equipment, both sound level and octaveband analysis noise surveys to identify and verify hazardous noise areas, employee education, and fitting and use of authorized hearing protection devices.

The health effects basis for the Coast Guard hearing conservation program are stipulated "Maximum Permissable Daily Exposures" (MPDEs) for various categories of Coast Guard hearing hazard environments. MPDEs were calculated on the basis of noise surveys coupled with damage risk criteria for impulse and continuous noises prepared for the Coast Guard by an expert committee under the auspices of the National Academy of Sciences. The damage risk criterion for continuous noise is 90 dBA.

Typical Coast Guard hearing hazard environments are classified as:

- Small boats of 46 feet and less
- Engine rooms of larger vessels
- Aircraft
- Ordnance
- Sound signals
- Industrial.

In the first three categories, propulsion engines are the primary sources of noise. Ordnance firing environments include vessels as well as indoor and outdoor small arms firing ranges. Industrial environments encompass, primarily, the Coast Guard Yard. Safety Manual CG-405, prescribes maximum permissible daily exposures for each of these environment categories. For continuous noise, MPDEs are expressed in hours and minutes, both without hearing protectors and with authorized types of hearing protectors. For gunfire, MPDE is expressed in rounds, or in the case of machine guns, in bursts. Industrial noise environments utilize the OSHA noise exposure standard.

No information was submitted on the actual implementation of this program nor data on funding or personnel levels for the hearing conservation program as these are not separately identifiable.

Noise Abatement

Noise related programs in DOT are primarily activities directed towards the development of techniques for reducing the noise environment in which the transportation media operates or which is developed by transportation systems and as such are discussed under RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAMS contained in the Appendices D, E, F, and G of this report. However, two DOT components, the U.S. Coast Guard and the Urban Mass Transportation Administration, conduct noise abatement activities.

U.S. Coast Guard (USCG)

The Ocean Engineering Division of the USCG is involved in a long-term project to reduce the noise associated with the operation of sound (fog) signals through the control, relocation, redirection, or multiple operation of these signals. Sound signal pollution affects all Federal waterways except those free of fog; e.g., Southern Florida, Puerto Rico, Hawaii. Efforts to reduce this type of noise pollution include

- Control – Procurement of fog detection devices to restrict operation of signals to periods of low visibility
- Relocation – Use of buoy sound signals, thereby removing the sound signal from shore areas
- Redirection – Determination of suitable baffles to attenuate nonseaward radiation
- Use of arrays to focus sound.

An outgrowth of this program is development of a previously discussed USCG policy directive regarding land use in the vicinity of fog signals, to avoid disposal of land that is subject to undesirable noise levels and to influence the development of adjacent non-Federally controlled areas.

The Naval Engineering Division of the USCG is concerned with noise abatement aboard ships and boats. Noise abatement aboard ship presents special problems due to weight, environmental, and fire retardant requirements. The Division's responsibility for the design and maintenance of USCG vessels includes noise abatement for both hearing impedance avoidance and habitability. Due to a lack of consolidated information specifically oriented toward shipboard noise control, the USCG entered into a contract for the development of a Noise Abatement Handbook, a design engineering manual for surface ships. The Naval Ship Engineering Center joined the USCG in this project, expanded its scope to suit Navy needs, and contributed to the funding so that the final contract was for $71,900. The Handbook has been completed but not published at this time.

The USCG noise program funding for FY73 included $3,500 for personnel expenses plus $18,000 for procurement of detectors to limit the operation of fog horns to periods of low visibility only. Estimated expenses for FY74 and FY75 are $115,000 and $50,000, respectively.

Urban Mass Transportation Administration (UMTA)

UMTA has undertaken preparation of a Rapid Transit Noise Abatement Handbook in an effort to make both current and future rapid transit systems as quiet as practicable for passenger/community acceptance. To achieve this goal, UMTA has initiated research studies which are discussed under Research, Development and Demonstration Programs.

Technical Assistance

The office of Noise Abatement in the Office of the Secretary and the Federal Highway Administration, each conducted a series of training courses during 1973 and 1974 for state and local officials.

The Office of Noise Abatement sponsored six 4-day courses for state law enforcement officers in methods for enacting and enforcing highway noise control regulations. This series of courses was one element in the larger DOT program to demonstrate quieted technology and reduce highway noise levels. Approximately 250 individuals from 47 states, the District of Columbia, DOT, and EPA attended the courses, which were conducted by the California Highway Patrol. A Type-2 sound level meter was provided to each state law enforcement officer, and a graphic level recorder was furnished to each state. Course materials, including an audio-visual slide presentation developed from the courses, are available for loan from the Office of Noise Abatement. Estimated FY73 funding for the courses, course material, equipment and travel expenses amounted to $450,000.

The Federal Highway Administration conducted a series of one-week courses in highway design for noise control. The courses were designed to train state highway department and FHWA personnel in the use of FHWA highway noise design standards and in the design factors which affect noise levels on adjacent land areas. Instruction material developed for the courses has been published. To augment these courses, the FHWA has outfitted a mobile training van, which is currently traveling throughout the nation to provide noise measurement and noise control training for FHWA field personnel and state highway department personnel. Estimated FY73 through 75 funding for equipment, salaries, and travel was approximately $150,000.

DEPARTMENT OF THE TREASURY

This Department conducts activities in the categories of standards and regulations, hearing conservation, and noise abatement.

Standards and Regulations

Section 9 of the NCA Delegates to the Secretary of the Treasury the authority to issue regulations (after consultation with the EPA Administrator) to govern the importation of new products identified under Section 6 (major noise source products) and 8 ("labeled" new products) so as to meet the domestic noise emission standards and regulations. Implementation of NCA Section 9 will benefit from the experience of applying EPA clean-air regulations to present motor-vehicle imports. While imports of only two Section 6 items, portable air compressors and medium and heavy duty trucks, initially will have to be regulated when such regulations become effective, the import regulation program must be flexible enough to deal eventually with a large variety of items potentially subject to noise standards such as chain saws, motorcycles, automobiles, electric motors, and snowmobiles.

The actual impact of regulations under Section 9 on the import trade will differ with each port of entry because of the geographical preferences of importers. Motorcycles from Japanese manufacturers will constitute a large volume of processing work on the West Coast while a large percentage of the heavy duty trucks entering the United States will do so through such small Canadian border points as Oroville, Washington.

Commercial importers will likely determine which products are importable and under what conditions. But, similar to the clean air regulations, individuals importing products for personal use may be a problem; a well-paced publicity program to keep the general public informed as new products are added to the controlled lists can hold item-by-item inspections and bonding arrangements pending product compliance to a minimum.

While NCA Section 9 provides for close collaboration between EPA and Treasury in handling imports, EPA retains full responsibility under the NCA for preventing violations of the import regulations. Any new product imported in violation of regulations promulgated by Treasury in consultation with EPA under Section 9 is also, *ipso facto*, one of the acts prohibited under NCA Section 10(a) (5). NCA Section 11(a) specifies that such willful violations are punishable by criminal penalties of up to $25,000 per day of violation in fines or by imprisonment for not more than one year, or by both.

Enforcement of import regulations will have to cover both Section 6 (major noise source) products and the "labeled" products of Section 8. If markings are used to identify compliance with import regulations for products defined in both Sections 6 and 8, then the import compliance markings would have to be affixed in addition to any (domestic) compliance label for new products.

At this point, customs procedures remain to be worked out for noise-control regulation enforcement. This will also include a decision on whether a new noise-control import declaration is to be developed or whether the present blue EPA Form 3520-1 will be revised to include noise-control coverage and to be made applicable also to nonvehicular products.

The NCA Section 10(a) (5) prohibits importation into the United States "of any new product in violation of a regulation prescribed under Section 9 which is applicable to such product." Thus, temporary deferrals of enforcement in regulations issued under the NCA or provisions for individual exemptions or bonding arrangements can be effected by Treasury issuing of modifying regulations.

Hearing Conservation

Information concerning hearing conservation was obtained from a number of the bureaus and services of the Treasury Department. Although it appears that general administrative direction on hearing conservation is provided by the Office of the Assistant Secretary of Administration, functional implementation of hearing conservation programs is carried out at the bureau and service level. The Department indicated that it follows OSHA policies and regulations and has not issued a Departmental directive on hearing conservation. Reported noise exposure problems included industrial machine noise and gunfire noise inside firing ranges. No information was provided on Department-wide funding and personnel levels associated with hearing conservation.

Reported Bureau and Service hearing conservation activities encompass one on-going formal program (Bureau of the Mint), one recently instituted formal program (Bureau of Engraving and Printing), and two efforts involving preventive measures affecting selected personnel (Customs Service and Secret Service).

Bureau of Engraving and Printing

The Bureau periodically requests the Public Health Service to conduct industrial hygiene surveys (including noise level measurements) intended to insure the safety of Bureau employees. As standard engineering practice, acoustical materials are used in those areas where the noise level is a consideration. The Bureau buildings encompass three isolated areas in which the noise level is high. Personnel who work in these areas are required to use ear protection devices. The Bureau has initiated a formal hearing conservation program requiring periodic audiometric examinations conducted by Public Health Service personnel, beginning in mid-November 1974. Approximately $5,000 will be spent to implement this program.

Bureau of the Mint

A mandatory hearing conservation program exists throughout the Bureau. Audiometric testing is given to all new employees and continues periodically throughout their service. Personal protective equipment is provided against the effects of noise.

At the request of the Bureau, the Industrial Hygiene Services Branch of NIOSH conducted hazard evaluation studies at industrially oriented Mint facilities. Among the hazards evaluated, noise was one of the predominant features in all the facilities. The noise levels ranged from a low of 75 dBA to a high of 112 dBA, especially in the rolling areas and press rooms. It was indicated that in the future, more emphasis will be given to conducting engineering and administrative noise abatement studies throughout the Bureau and to seeking corrective measures.

U.S. Customs Service

The Customs Service hearing conservation orientation is outlined in their Circular, FAC-11-FSB, "Facilities, Protecting Hearing Against Excessive Noise," dated December 19, 1972. This directive circular provides that personal protective equipment shall be provided and used in high noise level areas (airports, truck crossings, and seaports) and authorizes Customs' personnel to wear a hearing protective device of a type suitable to the user. No information was provided on the implementation of this directive nor data on associated funding.

Secret Service

The Secret Service advised that their primary area of concern is their firing ranges, where steps have been taken to provide the maximum in acoustical treatment and to furnish employees with protective devices. Personnel assigned to the ranges are given periodic audiometric tests.

Noise Abatement

The noise abatement efforts of the Department of Treasury are directed by the Assistant Secretary for Administration and are addressed as integral parts of a number of ongoing administrative programs including environmental quality, safety, and real property management. At the bureau level, managers and supervisors whose operations may be noise producing (such as building or facility managers or operational supervisors) routinely review and correct objectionable activities. Activities found not to be amenable to correction or abatement are reported to the Office of Administrative Programs, Office of the Assistant Secretary for Administration.

The Office of Administrative Programs has no separate departmental issuance regarding noise abatement and instead, follows existing Federal policy such as that incorporated in the Federal Property Management Regulations. The Office of Administrative Programs has no separate line items in its budget for departmental noise abatement activities. It appears that the Department does not have anyone assigned specifically to noise abatement. The need for separate noise abatement planning within the Department was reported to not yet have reached a point at which it is deemed necessary to develop a full-scale program.

Information was obtained from our organizations within the Department on their noise abatement activities.

Bureau of the Mint

The only reported noise abatement activity was a series of community noise surveys conducted by personnel of the Philadelphia Department of Public Health in the environs of the U.S. Mint in Philadelphia during the period June 16, 1972, to July 19, 1972. The preliminary results of the surveys did not show any significant difference in noise levels for conditions when the plant was in normal operation compared to when it was shut down. No followup studies or actions were reported.

Internal Revenue Service (IRS)

The Internal Revenue Service involvement in noise abatement is limited to indirect consideration for equipment selection and installation.

Consolidated Federal Law Enforcement Training Center (CFLETC)

Construction of this proposed facility in Beltsville, Maryland, has been delayed, but as part of the environmental impact statement process, a series of noise surveys were performed to evaluate the potential over-the-fence noise impact of the facilities. In 1972 construction had begun on a dignitary protective training area, and a board fence was erected between the training area and the Baltimore-Washington Parkway. The primary purpose of this fence is visual screening, with a secondary purpose to buffer and deflect the noise reflecting from the occasional shots fired in this area.

U.S. Customs Service

The Service identified a specific noise abatement problem at the Blue Water Bridge border crossing at Port Huron, Michigan, involving high noise levels in inspection booths from reverberation of road noises. This location is under the control of the Michigan State Highway Commission, and representatives of Customs and the Immigration and Naturalization Service continue to meet with Highway Commission officials in an attempt to resolve the noise problem at this site.

ACTION

The only reported activity concerned hearing conservation.

Hearing Conservation

ACTION does not presently have a formal hearing conservation program. However, ACTION is currently working with representatives of the Occupational Safety and Health Administration to conduct a joint inspection of the ACTION Washington facilities in order to identify problem areas and to develop an effective OSHA program.

ATOMIC ENERGY COMMISSION (AEC)*

AEC reported both hearing conservation and noise abatement activities.

Hearing Conservation

The Atomic Energy Commission management policy concerning hearing conservation is reflected in management policy directives called "AEC Manual Chapters." Specific contract requirements make these chapters mandatory for all AEC prime contractors to follow. In general, the requirements of the Occupational Safety and Health Act of 1970 and the recommendations of the American Conference of Governmental Industrial Hygienists are followed for occupational noise exposure.

Following enactment of the Occupational Safety and Health Act of 1970, the AEC required all of its contractors to inspect their facilities and to identify all areas or items of noncompliance. Engineering projects scheduled for completion as a result of these inspections are discussed under noise abatement since they are designed to improve working environments as well as to bring them into compliance with established occupational noise exposure standards to reduce the need for ear protective devices.

Noise-induced hearing loss was reported not to be a major problem in AEC or AEC contractor facilities as reflected in workman's compensation cases and the reports of occupational injury and disease experience, which are reported periodically by all AEC contractors. Audiometric testing is performed as a part of the physical examination requirements outlined in the AEC manual chapter dealing with occupational health.

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*Information for this report was submitted by AEC prior to the establishment of the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC).

The operating costs for the hearing conservation programs are not separately identifiable from the overall costs of the occupational health and safety programs maintained at AEC and contractor-operated facilities.

Noise Abatement

The noise abatement activities of the Atomic Energy Commission are primarily directed toward the control of their in-house noise problems. As a result of inspections of AEC and contractor-operated facilities in response to the Occupational Safety and Health Act of 1970, 11 noise abatement projects involving eight Government-owned facilities and totaling $809,000 have been identified and scheduled for completion by the end of FY77. None of these projects are designed primarily to reduce over-the-fence noise. In general, they are engineering projects to improve working environments and to bring them into compliance with established occupational noise exposure standards.

AEC reported that there are no substantive over-the-fence noise problems at AEC facilities due to the nature of AEC activities, which are conducted, for the most part, within large Government-owned sites. However, the environmental policies and requirements of Executive Order 11752 are enforced upon contractors operating AEC facilities by a standard contract clause.

AEC estimated identifiable environmental noise funding at AEC sites for FY73 through FY75 as $110,000 in FY73, $130,000 in FY74, and $240,000 in FY75. These expenditures are primarily for monitoring and surveillance, including meteorological measurements necessary for predicting noise propagation from high explosive shots.

CIVIL SERVICE COMMISSION (CSC)

Reported activities fall into hearing conservation and noise abatement categories.

Hearing Conservation

The Civil Service Commission reported that it does not have a formal hearing conservation program as its employees are not exposed to noise levels exceeding the OSHA standard. However, the Commission has taken preventive measures which include conducting periodic hearing tests and providing ear protective devices to employees regularly exposed to noise-producing equipment. An audiometer was recently purchased for employee hearing tests.

Noise Abatement

To ensure that no employee is exposed to hazardous noise levels, the Civil Service Commission has acoustical shields installed on noise-producing equipment such as automatic typewriters. In addition, periodic monitoring of selected work areas is conducted.

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC involvement in noise control is in the area of standards and regulations.

Standards and Regulations

The Consumer Product Safety Act (P.L. 92-573) was signed by the President on the same day as the NCA, October 27, 1972. The Act created the Consumer Product Safety Commission (CPSC) and authorized it to establish safety standards for consumer products. Paragraph 7(a) of the Act defines a consumer product as:

> "any article or a component part thereof produced or distributed (i) for sale to a consumer for use in or around a permanent or temporary household or residence, a school, in recreation, or otherwise, or (ii) for the personal use, consumption, or enjoyment of a consumer in or around a permanent or temporary household or residence, a school, in recreation, or otherwise."

CPSC standards may be requirements concerning performance, composition, content, design, construction, finish, packaging or labeling (para 7(a) (1) and (2)). Any requirement promulgated under this authority must be to reduce an unreasonable risk of injury associated with (use of) the product and preferably should be expressed in terms of a performance standard (paras 7(a) and 9(c) (2)).

The regulation of product safety is accomplished chiefly by appropriate disclosure and labeling of products. The Consumer Product Safety Act contained important implementing provisions for new consumer product descriptions (Section 13) and for the certification and labeling of new products (Section 14).

The authors of the Consumer Product Safety Act were aware that Commission authority would overlap that of other agencies. In the definition of "consumer product," certain items were excluded, therefore, that were regulated by other specified legislation:

The National Traffic and Motor Vehicle Safety Act of 1966

The Federal Insecticide, Fungicide and Rodenticide Act

The Federal Aviation Act

The Federal Boat Safety Act of 1971

The Federal Food, Drug and Cosmetic Act

The Poultry Products Inspection Act

The Federal Meat Inspection Act

The Egg Products Inspection Act.

Both CPSC and EPA have been given responsibility to deal with noise products. CPSC is authorized to regulate and label products with noise emissions that represent "an unreasonable risk of injury" under the aforementioned Section 7 of the CPS Act. In the first action under Section 7 that included noise control as a product safety element, the CPSC published a Notice of Proceeding for development of a consumer product safety standard applicable to power lawn mowers (39 *Federal Register*, No. 141, July 22, 1974, pp. 26662-4). The Notice cited potential for hearing loss and nonauditory trauma for exposure to excessive noise as one of the hazards associated with power lawn mowers that present unreasonable risk of injury, and invited any person to submit one or more existing standards or an offer to develop one or more proposed standards. In October 1974, CPSC published in the *Federal Register* its acceptance of the offer of Consumers Union of United States, Inc., to develop a standard that would include provision to eliminate or reduce the hazard associated with excessive noise generated by power lawn mowers.

Section 30(a) of the Consumer Product Safety Act transferred from HEW to CPSC functions under the Federal Hazardous Substance Act. In September 1973, CPSC published in the *Federal Register* revisions and reissuances of regulations promulgated under that Act, including one that banned from sale toy guns and caps producing an impulse peak pressure greater than 138 dB. The regulation provides for exemption from the ban for caps producing greater than 138 dB but not greater than 158 dB, although the package for exempt caps must carry a warning label.

EPA has consulted with CPSC on these actions and prospective further commission actions to control noisy products. On December 17, 1974, EPA submitted to CPSC a Draft Memorandum of Understanding to advance the arrangements for cooperation and coordination between the two agencies. This careful delineation is needed because EPA, in addition to its responsibilities for coordinating and reporting on all Federal noise control programs (under NCA Section 4), is also required to identify and regulate products that are major noise sources (NCA Section 6). EPA is also to effect the disclosure by labelling and other means of information on noise emissions of noisy products and on the effectiveness of products designed to protect the user from injurious noise (NCA Section 8).

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA activities encompass the areas of standards and regulations, hearing conservation and technical assistance. (EPA Federal coordination activities are treated elsewhere.)

Standards and Regulations

The National Environmental Policy Act of 1969 (NEPA), which established the Council on Environmental Quality, gave to the Federal Government broad responsibility for protecting the environment. However, NEPA did not cite noise as a pollutant. This gap was filled in formal fashion by the Clean Air Act the following year (1970) when, under Title IV of that Act, an Office of Noise Abatement and Control was established in EPA*. EPA, officially created on December 2, 1970, under Presidential Reorganization Plan No. 3, received, in Section 309, broad authority to review, and comment on, "the environmental impact of any matter relating to duties and responsibilities granted pursuant to this Act", including "proposed regulations published by any department or agency of the Federal Government." In 1972 the NCA reaffirmed and strengthened this charge regarding noise abatement and control in Section 4 of the Act.

The NCA further assigned to EPA the development of an analytical base with criteria and concepts that would be applicable to all Federal noise control programs (NCA Section 5). Based on these criteria and concepts, the NCA assigned to EPA specific subjects for regulatory action (NCA Sections 6, 8, 9, 15, 17, 18) and defined the procedural arrangements for implementing such action (NCA Sections 10 - 14).

Aircraft noise received special treatment in the NCA, which recognized the dimensions of the problem and the need to achieve noise control without diminution of safety and within technological and economic feasibilities. NCA Section 3, stipulates four general exclusions (including civil aircraft and military weapons or combat equipment) from the term "product" and therefore from EPA regulatory authority under Sections 6 and 8.

NCA Section 7 (incorporating the language of the Federal Aviation Act of 1958 as amended) assigns regulatory authority to control noise from civil aircraft to FAA. Section 7 also authorizes and directs EPA to propose alternative regulations to FAA if FAA regulations are considered insufficient to protect the public health and welfare. This authority and duty to propose measures to control aircraft noise clearly goes beyond the functions assigned to EPA under NCA Section 4.

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*Section 401 states that Title IV "may be cited as the 'Noise Pollution and Abatement Act of 1970'."

The overall process by which EPA develops regulations to control noise emissions from new products has been described and illustrated (in Figure 4-1) in Section 4 of this report. NCA Section 5 directed EPA to develop the analytical tools to be used in setting noise emission control standards. Subsection 5(a) (1) directed EPA to develop *criteria* to reflect the effect of noise on the public health and welfare. EPA published the required document on *Public Health and Welfare Criteria for Noise* on July 27, 1973.

Subsection 5(a) (2) of the NCA then directed EPA to publish information on *levels of environmental noise* that must be attained in defined areas under various conditions to protect the public health and welfare. In response, EPA published in March 1974 the "Levels Document".

The importance of the "Levels Document" to the EPA regulatory program for noise control cannot be overemphasized. EPA had to have some measure of merit to determine what constitutes a major source of noise, and within the classification of major sources, what order of importance should be ascribed to them in terms of human impact. Without such a measure, considering the multiplicity of sources with identical or near identical acoustical energy emission characteristics, the problem is formidable. Moreover, given the requirement in the law that the "process of identification" sets in motion a legal "time clock" on each product identified, the Agency is faced with difficulties in setting forth a priority scheme for dealing with the problems, unless it does have some sort of accumulative noise level goals or statements of environmental quality to use in the judgment process. This requirement was recognized as being fundamental to the regulatory process in the expert testimony of Administration witnesses before the Congress while the NCA was being considered. Also, without some such measure, the balance of cost and economic impact and technological feasibility and of public views and attitudes with respect to health and welfare requirements cannot be logically addressed. The benefits of proposed source emission regulations arrived at in this manner are quantified in terms of the expected change in the population impacted by the particular source of noise. EPA is continuing to develop and refine its data base and the methods for the estimation of population impacts.

Most important for a coordinated Federal regulatory effort to control noise is that all Federal agencies adopt and use a common descriptor for environmental noise and a common methodology in evolving standards and regulations. EPA provided such a common descriptor – L_{eq}/L_{dn} – and common methodology in the "Levels Document" and has been urging their adoption by all Federal agencies. EPA use of the L_{eq}/L_{dn} methodology in coordinating Federal noise research and control activities is discussed in greater detail in Section 3 of this report.

Following publication of the "Levels Document" in March 1974, EPA moved ahead to apply technology and cost data in regulatory action. Notices of Proposed Rule-Making for the first of the new product regulations on new trucks and portable air compressors, described further subsequently, were published in the *Federal Register* the last week of October 1974. An intensive effort is under way to initiate succeeding cycles of regulation preparation.

The "Levels Document" benchmarks are also vital to the aircraft and airport regulations proposals EPA has been developing for submission to the FAA in accordance with Section 7 of the Noise Control Act. Over the past 18 months, EPA has produced a series of project reports on aviation noise control regulations to be proposed, as indicated by EPA in its July 1973 Report on Aircraft Noise to the Congress, to the Federal Aviation Administration. These project reports have been widely distributed for comment as part of the public participation process in EPA rulemaking. Among the major criticisms received from that review process were those relating to the health and welfare benefit assessment. EPA found that the "Levels Document" base was needed for this task. But, in spite of the fact that sufficient time had not yet lapsed to develop adequately precise refinements in this area, sufficient information was nevertheless assembled to move ahead. Accordingly, EPA is now in the process of finalizing the proposals for submission to the Federal Aviation Administration.

One area in which the need for the "Levels Document" was not apparent is that relating to surface transportation interstate carrier requirements. The statutory provisions call for a noise regulation on surface transportation at a level basically aimed at facilitating commerce rather than at protecting health. Specifically, unlike other provisions of the Act, the interstate motor carrier and rail carrier provisions call for standards based on "best available technology taking into account the cost of compliance", without any stipulations as to health and welfare requirements. Further, these regulations preempt state and local actions. Substantial questions as to the economic implications of these regulations, especially as to their impact on railroads, in and of themselves created difficulties in arriving at appropriate judgments that could withstand the test of litigation in courts.

Although health and welfare were not specified in the statute, each Federal agency, including EPA, is required under NCA Section 4 to further the policies established in NCA Section 2; that is "to promote an environment free from noise that jeopardizes health and welfare." Thus there is an obvious relationship of the baselines of the "Levels Document" to the process of arriving at a balance between available technology and cost of compliance. While much of the delay in meeting the statutory dates of these regulations was attributable to situations relating to the technical and economic base, once the "Levels Document" was published it did facilitate resolution of those issues. It paved the way for publication of a proposed interstate rail regulation in July 1974 and promulgation of motor carrier regulations in October 1974.

In Subsection 5(b) of the NCA, EPA was directed to identify *products (or classes of products)* that the Administrator judged to be *major sources* of noise and to report on the technology, cost, and alternative methods to control the noise emissions from these major sources.

In identifying the first group of products, EPA gave priority to sources that contribute significantly to community noise; i.e., noise experienced by the community as a whole rather than noise experienced chiefly by individual users of the product. Using a two-step approach, EPA identified residential areas in which a large number of people are exposed to high day-night sound levels. The number of people exposed to these levels (L_{dn}) was published in the following table:

TABLE C-4

EXPOSURE TO OUTDOOR NOISE LEVELS:
US POPULATION EXPOSED, BY TYPES OF NOISE
(in millions)

Outdoor Ldn Level	*Urban Traffic Noise*	*Aircraft Noise*	*Construction Site Noise*	*Freeway Noise*
70 dB+	4-12	4-7	1-3	1-4
65 dB+	15-38	8-15	3-6	2-5
60 dB+	40-70	16-32	7-15	3-6

NOTE: Estimated number of people in residential areas subjected to noise of different kinds at or above specified day-night sound levels (outdoors)

Next, EPA identified the major contributors to the cumulative day-night sound levels and specified 9 categories of transportation vehicles and 13 categories of construction equipment as candidates for emission-standard development. Table C-5 shows the typical sound level for each of the categories in dBA at 50 feet and the related estimated total sound energy emitted by all existing models of each product category per day.

TABLE C-5

EPA IDENTIFICATION OF MAJOR NOISE-SOURCE CATEGORIES OF PRODUCTS

Transportation vehicles	*Typical sound level dBA at 50 ft.*	*Estimated total sound energy kWh/day*
1. Trucks (medium and heavy over 10,000 No. GVWR)	84	5,800
2. Automobiles (sports, compacts)	75	1,150
3. Automobiles (passenger)	66	800
4. Trucks (light, pickup)	72	570
5. Motorcycles (highway)	82	325
6. Buses (city and school)	73	20
7. Buses (highway)	82	12
8. Snowmobiles	85	500
9. Motorcycle (off-road)	85	100
Construction equipment		
1. Dump truck	86	206
2. Portable air compressors	81	147
3. Concrete mixer (truck)	85	111
4. Jackhammer	88	84
5. Scraper	88	79
6. Dozer	87	78
7. Paver	89	75
8. Generator	76	65
9. Piledriver	101	62
10. Drill	98	53
11. Pump	76	47
12. Pneumatic tools	85	36
13. Backhoe	85	33

These data were issued by the EPA Administrator on June 19, 1974 (39 FR 22297-9, June 21, 1974).

EPA has adopted a pattern of procedural steps for developing noise emission standards for new products and for the labeling of products. The pattern is shown in the diagram of Figure C-1. The pattern involves the identification of major sources of noise, the assessment of available technology and cost data, followed by a judgmental decision as to whether controls are feasible. Depending upon that judgment, either regulations are developed to protect the public health and welfare or a requirement is established to label products for which regulatory controls are not feasible. The diagram shows the investigative and preliminary decision processes established in Section 5 of the NCA that then result either in the regulatory sequence defined in NCA Section 6 or the consideration of a labeling regulation under NCA Section 8.

Section 6(a) (1) (C) of the NCA sets out the four categories of products to be regulated by the EPA Administrator for noise emissions:

1. Construction equipment
2. Transportation equipment (including recreational vehicles and related equipment)
3. Any motor or engine (including any equipment of which an engine or motor is an integral part)
4. Electrical or electronic equipment

Section 6(b) states that regulations may also be prescribed for products other than those indicated in Section 6(a) other than for civilian aircraft, military weapons and equipment, and NASA and other Federal experimental equipments as pointed out previously.

As the first item for the construction equipment category, EPA selected portable air compressors. Portable air compressors were identified as a major source of sound energy and the most widely used product among pieces of construction equipment contributing to construction site noise. With application of the criteria and measurements of Section 5(b) of the Noise Control Act, portable air compressors rated above 75 cubic feet per minute (CFM) were specified as a major source of noise. In construction equipment, pile drivers and rock drills have been perceived as the loudest pieces of construction equipment when they are operating, but measurements indicate that these products do not contribute as much sound energy to the environment as other products operating on construction sites. The fact that dump trucks, portable air compressors and concrete mixers (trucks) have sound levels equal to, or lower than, other construction equipment, and higher total sound energy emissions means that these are the most widely used pieces of construction equipment.

On February 22, 1974, EPA issued the Advance Notice of Proposed Rule-Making (ANPRM) on new portable air compressors soliciting information to feed into the regulatory process. A Notice of Proposed Rule-Making (NPRM) was issued on October 15, 1974, which

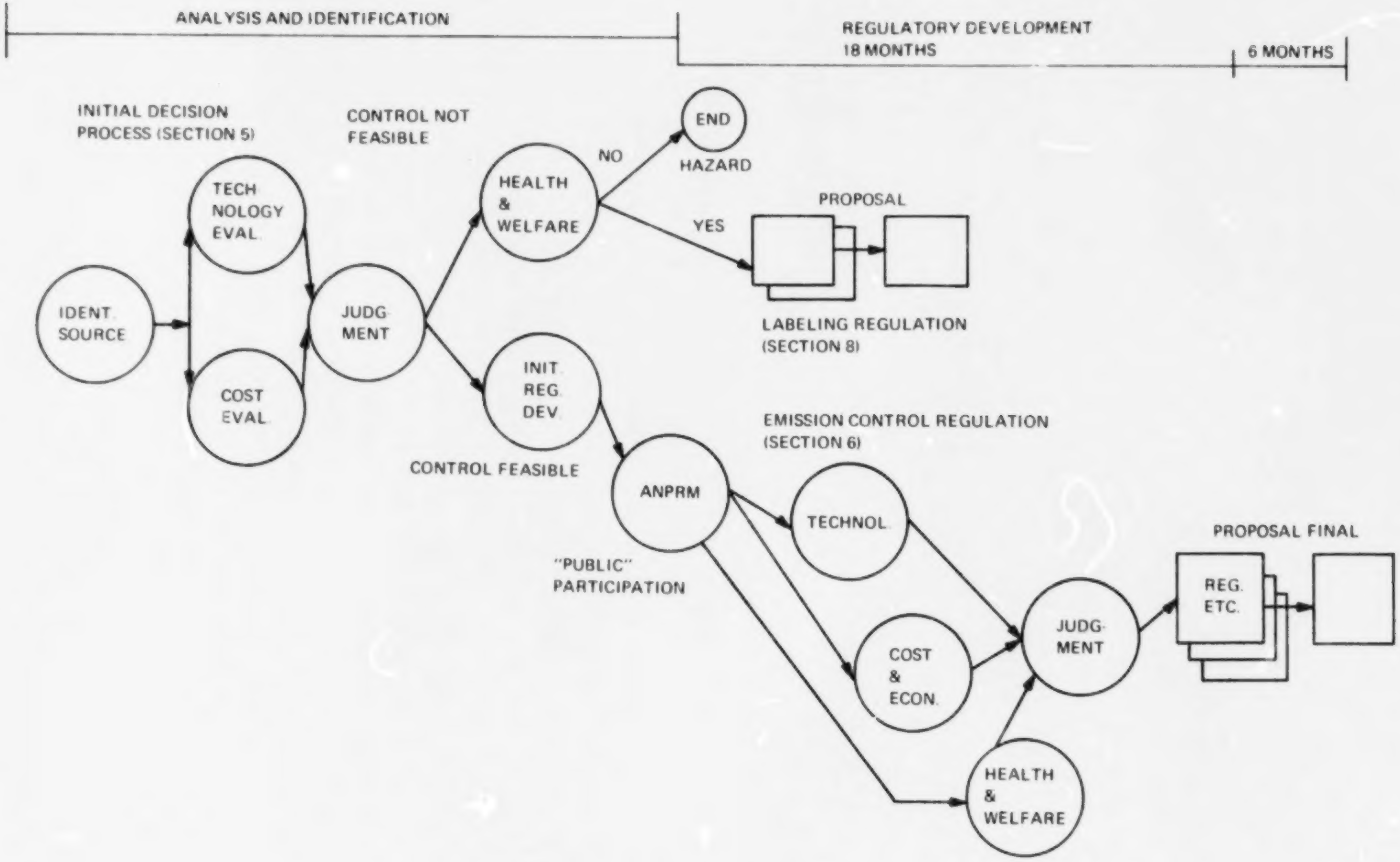
ANALYSIS AND IDENTIFICATION
REGULATORY DEVELOPMENT
18 MONTHS
6 MONTHS
INITIAL DECISION
PROCESS (SECTION 5)
CONTROL NOT
FEASIBLE
END
NO
HAZARD
YES
PROPOSAL
IDENT. SOURCE
TECH NOLOGY EVAL.
COST EVAL.
JUDG MENT
HEALTH & WELFARE
LABELING REGULATION
(SECTION 8)
INIT. REG. DEV.
CONTROL FEASIBLE
EMISSION CONTROL REGULATION
(SECTION 6)
ANPRM
TECHNOL.
"PUBLIC"
PARTICIPATION
PROPOSAL FINAL
COST & ECON.
JUDG MENT
REG. ETC.
HEALTH & WELFARE

Figure C-1. Noise Control Act of 1972;
Regulatory Action Matrix for Sections 5, 6, and 8

included a proposed noise emission standard providing that effective one year from the date of promulgation of the final regulation, newly manufactured portable air compressors shall not produce an average sound level in excess of 76 dBA when measured at a distance of seven meters (23 feet) from surfaces of the portable air compressor.

The regulation is expected to eliminate the portable air compressor as a major source of noise, particularly, as a major source of construction site noise. This will occur in time as the current population of portable air compressors is replaced by newly manufactured units complying with the proposed regulation.

The total first year capital cost increase to manufacture compressors that comply with the regulation is not expected to exceed $21 million.

Enforcement by EPA will include product verification testing, warranty labeling requirements, selective enforcement auditing procedures, and antitampering requirements. No state or political subdivision thereof may adopt or enforce any law or regulation that sets a limit on noise emissions from newly manufactured portable air compressors that is not identical to the Federal regulation. However, states or their political subdivisions are not denied the right to establish and enforce controls of environmental noise through the licensing, regulation, or restriction of use, operation, or movement of portable air compressors or combination of products that includes portable air compressors.

In the transportation equipment category, the control technology report prepared for EPA on dump trucks and concrete mixers indicated that their contribution to construction site noise is largely engine-related and will be controlled when these trucks meet the standards proposed for medium and heavy duty trucks. The ANPRM soliciting information on new medium and heavy duty trucks was issued by EPA on February 22, 1974 (docket Number 74-2), and the proposed regulation incorporating a noise emission standard was published on October 15, 1974.

The proposed standard applies to any truck with a vehicle weight rating (GVWR) in excess of 10,000 pounds. The specifications of the vehicle emission standard are as follows:

- Low Speed Sound Emission Standard:
    1. Sound emissions from 1977 through 1980 model year vehicles shall not exceed 83 dBA.
    2. Sound emissions for 1981 through 1982 model year vehicles shall not exceed 80 dBA.
    3. Sound emissions from 1983 and subsequent model year vehicles shall not exceed 75 dBA.

The 1972 population of medium- and heavy-duty trucks to which the proposed regulations are applicable is estimated to be about 3.5 million vehicles, of which approximately 65 percent are gasoline powered and 35 percent diesel powered. Based on current trends, this population is estimated to increase to about 5.5 million in 1990, with a greater portion of diesel powered trucks being present.

Based on 1973 technology, the first year increased capital costs for user/trucks purchasing industries are estimated to be $34 million in 1977 for 83 dBA, $132 million in 1981 for 80 dBA, and $318 million in 1983 for 75 dBA. The costs actually incurred in 1983 are expected, in fact, to be less than those cited here, since it is fully anticipated that technology of noise control will advance substantially over the ten year period before the 75 dBA standard becomes effective.

Various economic impact considerations were assessed to evaluate potential price and operating costs resulting from the proposed standard. Upper bound cost values were used to provide worst case estimates. The following economic impacts are envisioned:

- Because of the basically strong position of the truck manufacturing industry, the volume changes brought about by noise control regulations will have little overall impact on most firms.
- The impact of noise abatement upon all classes of truck users (i.e., line haul, contract, and private) will be small, since the cost of noise abatement represents an increase in less than one percent in the annual cost of owning and operating a large diesel truck.

It is anticipated that the implementation of a standard not to exceed 75 dBA will reduce noise from new medium and heavy trucks to a point at which it will not longer be a substantial cause of annoyance to the population. Some time will be required for the older (noisier) trucks now in use to be retired and replaced by new quiet trucks. After this occurs, an estimated 35 million people directly and continually impacted by the noise from such trucks will have the benefit of significant noise reduction in their environment. The benefits will accrue, however, to all Americans who experience annoyance from the noise of such vehicles.

The enforcement arrangements for, and preemptive position of, the standard for trucks are the same as those previously stated for the portable air compressor regulation.

Under NCA Section 7(a) the EPA Administrator was to conduct a study of:

1. Adequacy of Federal Aviation Administration flight and operational noise controls.
2. Adequacy of noise emission standards on new and existing aircraft, together with recommendations on the retrofitting and phaseout of existing aircraft.

3. Implications of identifying and achieving levels of cumulative noise exposure around airports.
4. Additional measures available to airport operators and local governments to control aircraft noise.

The report on the results of this study submitted to the Committee on Interstate and Foreign Commerce of the House of Representatives and the Committees on Commerce and Public Works of the Senate within the mandated nine months from the enactment of the NCA was published as the *EPA Report to the Congress on Aircraft/Airport Noise*, July 1973 (116 pp.). Under Section 611 of the Federal Aviation Act, as amended by the NCA, EPA was also required, not earlier than the date of submission of the report to the Congress, to submit to the Federal Aviation Administration proposed regulations to provide such control and abatement of aircraft noise and sonic boom (including control and abatement through the exercise of any of FAA regulatory authority over air commerce or transportation or over aircraft or airport operations) as the Administrator of the EPA determines is necessary to protect the public health and welfare.

In accordance with this latter requirement, EPA published in the *Federal Register*, on February 19, 1974, a "Notice of Public Comment Period" containing a synopsis of the proposed rules it was considering to achieve a satisfactory level of aircraft noise control and abatement for the protection of the public health and welfare.

The proposed rules and the type of control that each rule would implement were listed as follows:

- *Flight procedures noise control*
  1. Takeoff procedures
  2. Approach procedures
  3. Minimum altitudes
- *Source noise control*
  4. Retrofit/fleet noise level
  5. Supersonic civil aircraft noise
  6. Modifications to Part 36 of the Federal Aviation Regulations
  7. Propeller driven small airplanes
  8. Short haul aircraft
- *Airport operations noise control*
  9. Airport goals, mechanisms and processes by which noise exposure of communities around airports can be limited to levels consistent with public health and welfare requirements.

The relationship of these EPA proposals to the extant and proposed FAA regulations has been noted in Table 4-3. On December 6, 1974, EPA transmitted to FAA as Rulemaking Proposals recommendations for *Noise Abatement Minimum Altitudes with Terminal Areas: Turbojet Powered Airplanes* (item 3 on the EPA proposed schedule) and *Noise Standards for Propeller Driven Small Airplanes* (item 7 on the EPA schedule), with supporting documentation and justification. On January 29, 1975, EPA submitted to FAA NPRM proposals for *Civil Subsonic Turbojet Engine-Powered Airplanes: Noise Retrofit Requirements* and *Fleet Noise Level Requirements* (both item 4 on the EPA schedule). The NPRM proposal for *Aircraft Noise Requirements: Civil Supersonic Airplanes* (EPA item 5) was submitted to FAA on February 28, 1975.

In addition to designating, and controlling sound emissions from, products that are major noise sources, EPA is required, under Section 8 of the NCA, to designate products that emit noise that adversely affect the public health and welfare or that are sold on the basis of their effectiveness in reducing noise. EPA is directed to assure, by labeling or comparable means, disclosure and dissemination of adequate information on such products to the ultimate purchaser and user of the products.

Subsection (a) of Section 8 directs EPA to require by regulation for each designated product or class of products that notice be given to the prospective user as to the level of the noise the product emits or on its effectiveness in reducing noise, as the case may be. The regulation must specify whether the notice is to be affixed to the product or to the outside of the container, or to both, at the time of its sale to the ultimate purchaser or whether such notice shall be given to the prospective user in some other manner. The EPA regulation also must specify the form of notice and the methods and units of measurement to be used to determine effective noise attenuation.

In the first rulemaking under NCA Section 8, the agency announced that it was planning "to designate hearing protectors as a product sold wholly or in part on the basis of their effectiveness in reducing noise and to require that such products be labeled according to their noise attenuation capability." The Advance Notice points out that for persons located in environments in which noise emission controls (at the source or along the propagation path) are not feasible or adequate, hearing protectors represent the only practicable means of controlling the amount of noise received. Users therefore must know whether the products selected to protect hearing have adequate noise attenuation capabilities. The proposed regulation will require that this information be provided on labels affixed to all hearing protectors offered for sale wholly or in part on the basis of their effectiveness in reducing noise. The Advance Notice solicits, with a deadline of February 1, 1975, information on models of hearing protectors, the manner in which information on such protectors is now conveyed, classification of hearing protectors, information on their use and hazards associated with improper use, suggestions for the form of labels to be used, and the manufacturers and distributors affected.

It is anticipated that this labeling regulation will greatly assist the hearing conservation programs in government and industry by providing specific, uniform, and conveniently accessible information on the effectiveness of hearing protectors where these provide the essential means of protection from harmful noise. Labeling of hearing protectors is an essential first step in the warning and protective procedures for labeling of hazardous products. Without information as to the type of protection available and its efficacy, the hazard warning in many instances offers little or no choice as to use or nonuse of the product.

NCA Section 15 establishes the process by which the Federal Government will give preference in its purchasing to products with noise emissions significantly lower than those required by the Federal noise emission standards promulgated pursuant to NCA Section 6. In February, 1974, EPA published the Low Noise Emission Product (LNEP) certification procedures in the Federal Register. The process involves three steps:

1. EPA will determine upon receipt of a properly filed certification application whether a class or model of product is a low-noise-emission product.
2. EPA will decide whether the low-noise-emission product is suitable for use as a substitute for a type of product at that time in use by agencies of the Federal Government. If the product is found suitable, the Administrator will issue a certificate for that product, effective for a period of one year from the date of issuance.
3. The Administrator of the General Services Administration will determine whether the certified product has procurement costs that are no more than 125 percent of the retail price of the least expensive type of product for which they are certified substitutes. If the low-noise-emission product meets this final requirement, it should be acquired by purchase or lease by the Federal Government for use by the Federal Government instead of the products for which it is a suitable substitute.

In making judgments of suitable substitutes, EPA will consult with the appropriate Federal agencies before making decisions. The procedure requires that the LNEP product comply with the labeling provision of Section 8 of the NCA and be subject also to post-certification testing. The LNEP will be certified for one year but upon application a recertification can be issued for another year.

Since, the Section 15 authorization applies only to new products for which standards have been promulgated under NCA Section 6, implementation of the LNEP provision must be deferred until Section 6 standards become operative. The certification procedures do not contain the objective low-noise-emission criteria for regulated new products nor do they contain the specific data requirements for deciding whether the product is a "suitable substitute". These will be published subsequently.

Interstate Carriers

NCA Sections 17 and 18 direct the EPA Administrator to issue noise standards for carriers engaged in interstate commerce by rail and motor carrier:

Interstate Rail Carrier Noise Emission Standards (NCA Section 17)

EPA moved to implement Section 17 of the NCA when it proposed on June 24, 1974, to establish a new Part 201 of Title 40 CFR containing noise emission regulations for surface carriers engaged in interstate commerce by railroad.

The proposed regulation will establish standards for noise emissions resulting from the operation of locomotives and railroad cars of surface carriers engaged in interstate commerce by railroad. The proposed standard specified sound-levels measured at a distance of 30 meters (100 feet) from the centerline of the track on which the locomotive or railroad car being measured is located and is specified in decibels on the A-weighted scale, using fast meter response.

The EPA proposed regulation specifies the following standards for locomotives:

"A. *Locomotive Standard:* All locomotives to which this regulation is applicable are to meet the following noise emission standards under stationary test conditions:

1. Effective 270 days from the date of promulgation of the regulation locomotives tested singly shall not exceed 93 dBA at any throttle setting and 73 dBA at idle when measured at 30 meters (100 feet) over any surface.
2. Effective four years from the date of promulgation of the regulation locomotives tested singly shall not exceed 87 dBA at any throttle setting and 67 dBA at idle when measured at 30 meters (100 feet) over any surface."

Similarly, all locomotives or combination of locomotives to which this regulation is applicable, are to meet the following noise emission standards under moving conditions:

"1. Effective 270 days from the date of promulgation of the regulation, 96 dBA when moving at any time under any condition of grade, load, acceleration, or deceleration as measured over any surface at 30 meters (100 feet).

2. Effective four years from the date of promulgation of the regulations, 90 dBA when moving at any time under any condition of grade, load, acceleration, or deceleration as measured over any surface at 30 meters (100 feet)."

For railroad cars, the proposed EPA standard is as follows:

> "B. *Railroad Car Standard:* Effective 270 days from the date of promulgation of these regulations, all railroad cars or combination of railroad cars operated by surface carriers engaged in interstate commerce by railroad are to meet a noise emission standard of 88 dBA at speeds up to and including 72 km/hr (45 mph) and 93 dBA at speeds greater than 72 km/hr (45 mph) when measured at 30 meters (100 feet) over any surface."

After the final interstate rail carrier noise emission standards have been promulgated by EPA and after consultation with the Administrator of EPA, the Secretary of Transportation is responsible for promulgating regulations to insure compliance with the EPA standards.

In compliance with Section 18 of the NCA, EPA proposed on July 27, 1973, standards to control noise emissions from motor vehicles operated in interstate commerce and weighing over 10,000 lb. GVWR. The final regulation was issued on October 21, 1974. The standards provide

- A maximum of 90 dBA at 50 feet in speed limits greater than 35 mph.
- A maximum of 86 dBA at 50 feet in speed limits equal to or less than 35 mph.
- A maximum of 88 dBA at 50 feet under stationary runup test.
- Visual exhaust system inspection.
- Visual tire inspection.

This regulations is the first significant Federal step in a series of actions to reduce highway noise by October 1975. This standard, applicable to in-use vehicles operated by interstate carriers, will have an impact within one year on reducing highway traffic noise. In conjunction with the more stringent, new medium and heavy-duty truck noise control regulations cited earlier, further traffic noise reduction will be accomplished in a systematic time-phased manner to permit application of available technology at a reasonable cost.

As new control retrofit technology is developed and can be applied at reasonable cost, the interstate motor carrier regulations will be revised accordingly. Further revision of the interstate motor regulations, will be made to assure that new trucks manufactured in accordance with the more stringent new product noise control standards will not be degraded acoustically during inservice operation by interstate carriers.

It is anticipated that seven percent (70,000) of the one million motor vehicles to which the regulations apply will require some degree of retrofit to comply with the regulations. Usually, a muffler or different tires will suffice. In some cases, the cooling fan will require modification. The average expected cost per vehicle needing retrofit treatment is $135; total costs to the industry are not expected to exceed $10 million.

Section 2 of the Noise Control Act says that state and local governments have the primary responsibility for noise abatement and control. However, it was recognized that Federal action is needed to deal effectively with major noise sources engaged in interstate commerce and which, therefore, require uniform national treatment to facilitate such commerce.

State and local jurisdictions may not adopt or enforce noise control regulations of the noise sources covered by the interstate rail and motor carrier regulations unless such state or local regulations are identical to the Federal regulations. Federal preemption for interstate rail and motor carrier noise control regulations (Sections 17 and 18 of the NCA, 1972) is significantly different from the preemptive Federal authority for newly manufactured trucks (Section 6 of the NCA, 1972), which leaves to state and local jurisdictions the authority to establish and enforce controls on levels of noise emission resulting from the operations of such new trucks. However, state and localities are strongly urged to adopt regulations that may be necessary to meet special local needs as long as the action is determined not to be in conflict with the Federal regulations. In these cases, application shall be made to the EPA Administrator for such determination.

Under the law, the Secretary of Transportation, after consulting with the Administrator of EPA, is responsible for assuring compliance with the interstate motor carrier noise emission standards. State and local jurisdictions employing identical standards, are encouraged to act as independent enforcement agencies.

Hearing Conservation

Although noise is not presently a significant problem within EPA, and therefore, no formal hearing conservation program has been established, evaluation of operational areas in which noise hazards might develop is undertaken, and limited preventive measures have been instituted. These efforts are incorporated as part of the Agency safety program, which is under the overall direction of the Deputy Assistant Administrator for Administration and implemented by the Safety Management Staff. EPA Order 1000.11, dated April 4, 1973, establishes Agency policy concerning safety and health at Agency facilities and in Agency operations. OSHA standards were adopted as internal EPA Safety Standards, but action has been initiated to reduce the permissable 8-hour exposure limit to 85 dBA. Presently, EPA Form 1440-1, "Supervisor's Report of Accident" which is included in the Agency *Safety Management Manual* has several spaces provided for documentation of noise related problems. During 1975, the Safety Management Staff plans to develop a Manual chapter on noise that will impose requirements for Regional and National Environmental Research Center sound surveys to be conducted as part of the semiannual safety survey of each facility presently required.

In 1972, two sound level meters were purchased, which have been used to measure noise levels in various Headquarters offices. In no instance, has noise exposure been identified exceeding 85 dBA for an 8-hour duration. As part of a comprehensive OSHA safety survey of all EPA permanent facilities, performed under contract, noise measurements were taken in areas in which noise problems were suspected. The EPA/DC Pilot Plant at Blue Plains was the only location where a noise level approaching 85 dBA was identified. The Safety Management Staff believes that noise problems may exist in many EPA remote field sampling operations. Sound surveys have not as yet been performed on such equipment as motorboats, helicopters, and fixed wing aircraft. An industrial hygienist is being recruited whose duties will include performance of noise surveys to identify areas where potentially hazardous noise may exist. The EPA Office of Noise Abatement and Control plans to provide technical assistance for such surveys.

The Personnel Management Division conducts audiometric testing of Headquarters personnel on a voluntary basis. During 1973, 100 Headquarters personnel were tested in addition to the 389 employees receiving audiometric tests as part of their regular physical examinations. In the EPA regional offices, 513 employees were tested during 1973. Upon identification of employee exposure to levels of 85 dBA or more for an extended period of time, a mandatory testing program will be established for the employee. There have not been any incidents of employee hearing loss as a direct or indirect result of occupational noise exposure.

Technical Assistance

Section 14 (2) of the Noise Control Act authorizes EPA to provide technical assistance to state and local governments to facilitate their development and enforcement of ambient noise standards, including but not limited to

- Advice on training of noise control personnel and on selection and operation of noise abatement equipment.
- Preparation of model state or local legislation for noise control.

Responsibility for implementing this section of the Act is vested in the Technical Assistance Branch of the Technical Assistance and Operations Division, one of the two major divisions of the EPA Office of Noise Abatement and Control (ONAC), in conjunction with the ten Regional Offices. EPA noise technical assistance funding totalled $48,600 in FY73, $934,700 in FY74, (the large scale increase over FY73 is attributable to the passage of the

Noise Control Act in the second quarter of FY73) and $936,900 in FY75. Although funds allocated to the technical assistance program increased from FY74 to FY75, the proportion of technical assistance resources to total ONAC resources decreased over this period. This reflects the present ONAC emphasis on the development of noise emission standards and regulations mandated by the Noise Control Act.

ONAC has utilized a variety of mechanisms to augment and complement the technical skills available in its permanent work force. These include the use of intermittent consultants with specialized expertise, Interagency Agreements, and staffing under the Intergovernmental Personnel Act (IPA) of 1970, which permits the temporary assignment of personnel among the Federal Government and state and local governments and institutions of higher education to perform assignments mutually beneficial to the organizations involved. The use of IPA personnel has been extremely beneficial to the regional noise programs, where continuity and level of staffing difficulties have been pronounced. To augment regional capabilities, ONAC is developing noise training courses for EPA regional personnel. EPA has also initiated steps to enter into Basic Ordering Agreements to provide technical acoustical services to the regions and to ONAC, for which $120,000 has been allocated during FY75.

Given scarce resources and extensive requests for technical assistance from state and local governments, the EPA technical assistance program is primarily designed to develop and disseminate standardized guidelines and information. Thirty States and 89 municipalities specifically requested technical assistance from EPA in responding to a survey conducted in January, 1974. This survey was directed to all 50 States and to approximately 240 cities with populations over 75,000. The number of technical assistance requests obtained in the survey are believed to represent only a third of the total need. EPA is currently evaluating the survey data to assess the needs of state and local governments for Federal assistance and plans to report on its findings by the end of FY75. Consideration will be given to developing legislative proposals for an assistance program to state and local governments.

Based on the survey data, EPA has developed a matrix (Table C-6) indicating the population impacted by various types of state and local noise legislation over the period FY74 to 76. The figures shown for FY75 and FY76 are projections based on those reported for FY74. It is estimated that for FY76 30 States and 200 municipalities (with populations of 75,000 and over) will have enacted enabling legislation for noise control with respective population coverages of 168 million and 77 million. The FY76 figures represent a doubling over FY74 of the number of state and local governments that will institute preliminary steps towards noise control programs. The magnitude of this projected increase over a relatively short period has significant implications for EPA technical assistance efforts.

TABLE C-6

POPULATION IMPACTED BY VARIOUS TYPES OF STATE AND LOCAL NOISE LEGISLATION

		ENABLING		*STANDARDS*						*LAND USE*	
				MOTOR VEHICLES		*CONSTRUCTION EQUIPMENT*		*RECREATIONAL VEHICLES*			
		S	L	S	L	S	L	S	L	S	L
FY74	NO. PIECES OF LEGISLATION	13	100	9	29	0	14	14	10	4	54
	POPULATION IMPACTED*	87M	46M	50M	16M	OM	14M	75M	5M	41M	25M
FY75	NO. PIECES OF LEGISLATION	21	150	13	38	6	21	21	18	13	81
	POPULATION IMPACTED*	124M	56M	73M	19M	49M	16M	111M	7M	104M	30M
FY76	NO. PIECES OF LEGISLATION	30	200	20	61	11	25	26	21	19	83
	POPULATION IMPACTED*	168M	77M	110M	24M	79M	17M	129M	8M	135M	32M

S - STATES
L - LOCALITIES WITH POPULATIONS OF 75,000 OR MORE
* - POPULATIONS IMPACTED GIVEN IN MILLION OF PEOPLE

The EPA technical assistance program may be divided into four areas:

1. Legislation development and implementation
2. Manpower assessment and education
3. Advice on instrumentation and monitoring systems
4. Problem identification and assessment.

Specific EPA projects in each of these areas are discussed subsequently. Contractual and Interagency Agreement funds for specific projects are identified where applicable.

Legislation Development and Implementation

EPA seeks to channel the intense interest in noise control among state and local governments into their adoption of quantitative legislation that is technically sound and legally enforceable. EPA efforts in this area include model legislation, reports and guidelines, and in-depth assistance to individual states and cities.

Model Legislation

In cooperation with the Council of State Governments, EPA developed model state enabling legislation for noise control. The model law was published in the Council's 1974 handbook of suggested state legislation, and its provisions have been adopted either in their entirety or in part by several state legislatures. EPA is in the final stages of drafting model urban noise legislation, which is scheduled to be submitted to the National Institute of Municipal Law Officers (NIMLO) within the next several months for sponsorship as recommended legislation. The law will include both nuisance and performance provisions and will cover stationary and mobile noise sources, together with land use planning. EPA has initiated a literature search and critical assessment of building codes as the first step towards development of a comprehensive model building code incorporating noise specifications. When completed, EPA plans to seek adoption of the model building code by both the Council of State Governments and NIMLO.

Reports and Guidelines

To increase the utility of model legislation to local governments, EPA has under development a Community Noise Workbook containing guidelines for local noise control programs. The Workbook, which is scheduled for publication during CY75, will include the model urban noise legislation now being drafted amplified by alternative provisions and discussion sections to enable communities to select those most appropriate to their noise problems.

Designed for the nontechnical layman, the Workbook describes the legal basis for community action, noise effects on health and welfare, and procedures to establish and maintain a local noise control program.

EPA is currently updating the technical document "State and Municipal Non-Occupational Noise Programs" and has printed a revised edition of "Noise Source Regulation in State and Local Noise Ordinances". These reports are based on information collected from the survey of state and local noise programs conducted in January, 1974. EPA has taken preliminary steps to gather data on the noise programs of communities with populations under 75,000 and county governments, two areas not covered in the original survey. EPA has earmarked $20,000 of FY75 funds to establish a computerized system for the storage of all state and local noise program data. This computer bank will be used to shape the EPA technical assistance program and to identify types of noise problems peculiar to a specific area. The data will feed into the EPA standards setting process in two ways:

1. Aid in the identification of major noise sources for future regulation.
2. Provide baseline data for ongoing EPA regulatory activities.

In-depth Assistance to Targeted States and Communities

EPA, both at the headquarters and regional levels, directly assists various state and local governments in the technical and legal review of proposed noise legislation. Based in part on the survey results, EPA has identified those state and local governments most amenable to establishing noise abatement programs and will provide in-depth assistance to encourage adoption of EPA model legislation.

Manpower Assessment and Education

One of the greatest difficulties encountered by state and local governments in implementing noise control programs is the lack of trained manpower in this recent environmental field. The primary EPA activity in this area is sponsoring regional noise workshops and seminars for state and local government officials. Initiated by a 2-day national pilot workshop held in September 1972 in Kansas City, EPA has conducted 21 additional workshops at various locations throughout the country as of September, 1974. The educational workshops held during 1972 and 1973 were aimed at stimulating awareness of the noise problem through presentations on health effects, measurement and instrumentation, and the EPA role. The program has now moved into its second phase, that of disseminating specific data on the formulation and enforcement of noise legislation. These seminars are more technically oriented and include laboratory measurement exercises, field trips to monitor specific noise sources, and enforcement techniques.

Guidelines for a training course in noise survey techniques has been developed for EPA by the National Academy of Science Committee on Hearing, Bioacoustics, and Biomechanics. ONAC also participates in the EPA Office of Education and Manpower Planning strategy studies and projects to ensure that noise control needs are addressed in Agency manpower development programs.

Advice on Instrumentation and Monitoring Programs

In addition to responding to specific requests from state and local governments for technical advice on the quality and uses of noise instrumentation, EPA has undertaken two projects that will assist states and localities in this area:

1. The development of a low-cost sound level meter
2. The pilot monitoring project.

Development of Low-Cost Sound Level Meter

This project, which was initiated in February 1972 and is scheduled for completion in mid-1975, is designed to stimulate the availability of low cost instrumentation. The price of commercially marketed sound level meters that conform to ANSI standards proved prohibitive to some state and local governments. By absorbing the development, prototype fabrication, and testing costs, EPA is attempting to remove this obstacle to state and local enforcement programs. The Air Force Academy developed the concept and specifications under an Interagency Agreement funded at $10,000 during FY72 to 74. An FY75 competitive contract for $25,000 will be let for fabrication of 15 prototype sound level meters and 35 kits that may be assembled by the purchaser.

Pilot Monitoring Project

This project, which was initiated in May 1973 and is scheduled for completion during FY75, is the first phase of a long-term environmental monitoring program. Four EPA regional offices are participating in the pilot monitoring project, which is designed to field test instrumentation and alternative monitoring strategies while at the same time collecting baseline data from

- Selected sites useful for regulation development
- Communities
- Specialized land useage areas.

FY74 funding for the project totalled $72,000, which was used to purchase noise instrumentation. The budgeted funding for FY75 is $141,000 broken down as follows:

Methodology	– $20,000;
Instrumentation	– $41,000;
Data processing	– $30,000;
Interagency Agreement with the Department of the Army/Construction Engineering Research Laboratory for technical assistance for monitoring systems development and field survey capability	– $50,000.

EPA anticipates that the environmental monitoring program will assist state and local governments in four areas:

1. Prescribing several acceptable monitoring systems.
2. Enabling state and local governments to identify specific noise problems through surveys.
3. Providing background data for legislation development.
4. Aiding community assessment of the success of established noise control programs.

Problem Identification and Assessment

States and localities have access to EPA reports and findings on measurement methodology, cost and technology studies, etc., generated by the standards setting process. In addition to this data, which states and municipalities may use for noise problem identification and assessment, four other programs provide assistance in this area.

Study of Interior Noise Levels for Transportation Systems

A literature survey of data on the interior noise levels of aircraft, trains, trucks, buses, rapid transit systems and automobiles has been completed on the basis of which program recommendations are presently being formulated. EPA anticipates that the study results will assist state and local agencies to set noise specifications for the purchase of transportation equipment. Data developed in this study will be one element in assessing the impact of community noise on individuals over a 24-hour period.

Noise Surveys of Selected Sites

To test measurement methodology and instrumentation and to gather data on environmental noise levels for use by state or local agencies, EPA has participated in various noise surveys. One example was the extensive community noise survey conducted in Puerto Rico in August 1972 in response to a request by the Puerto Rican Government. Another was an assessment of environmental noise levels in the Waco, Texas metropolitan area. ONAC funded this FY74 study and its accompanying report for $25,000. The Waco study demonstrated that the least sophisticated sound measuring equipment and untrained personnel are sufficient to successfully conduct a community survey to assist local planners.

Instruction Manual for "Levels Document"

The environmental noise levels specified in the "Levels Document" may be used by states and communities as guidelines to determine the objectives of their noise abatement programs. The "Levels Document" contains a highly sophisticated treatment of the health and welfare effects of sound. EPA is developing an instructional manual to increase the utility of the document by interpreting in simplified terms those features which provide a foundation for the formulation of noise regulations and by including basic concepts in noise measurement.

Information Services

EPA has established a library of technical information, which has been given an important assist through the introduction of a computerized information retrieval system containing abstracted noise data. This data bank, with terminals at headquarters and regional offices, is used in part to reply to state and local information requirements. Required inputs to the data management system, based on EPA program priorities, include information on specified noise sources, control technology, and other abatement techniques available or under development, measurement methodologies, and noise laws and regulations. These acquisitions, which average 65 per week, are used not only to assist state and local governments, but also for the standard-setting process and to keep current the criteria document and environmental noise report required by Section 5 of the Noise Control Act. System outputs include a biweekly listing of acquisitions, a biweekly noise current events bulletin, and special compilations such as demand bibliographies and literature surveys. Funding for the information retrieval system was $444,000 in FY74 and budgeted at $225,000 in FY75. Since the system is used by all elements of ONAC, the technical assistance portion of these funds is not separable.

In addition to the technical assistance projects just mentioned, EPA is developing a Cooperative Noise Reduction Program designed to encourage early and voluntary compliance with the Interstate Motor Carrier Noise Regulations. Although resource requirements have not been finally approved, the present plan provides for training state and local enforcers, the use of state weighing and inspection stations for noise level tests, and development and distribution of promotional material. One anticipated benefit of the program is increased state and local awareness of their role in noise reduction.

FEDERAL COMMUNICATIONS COMMISSION (FCC)

This agency reported activities only in the area of hearing conservation.

Hearing Conservation

At present, the Federal Communications Commission has no organized or coordinated hearing conservation program. Ad hoc measures are taken to reduce noise levels and provide hearing protection devices in isolated instances in which employees are exposed to excessive noise. For example, electronic equipment is tested in the Commission laboratory, including ultrasonic cleaners that produce noise levels on the order of 100 to 120 dB. Employees are engaged in such work intermittently and are furnished with ear muffs similar to those used at rifle ranges. A new laboratory is under construction that will be equipped with sound absorbing containers for testing such equipment. Another example is the duplicating staff exposure to a relatively high level of background noise. Print shop noise levels have been reduced with the purchase of quieter, replacement equipment and installation of sound suppressing ceilings.

Periodic hearing tests conducted by the Washington Hearing Society are available to employees through the Health Unit. These are simple screening tests and do not distinguish between noise and other causes of hearing loss. No disability claims based on hearing loss have been submitted over at least the last ten years, nor have there been any complaints or other indication of a noise problem at any installation.

No funds for noise or related problems have been appropriated to or committed by the Commission.

FEDERAL DEPOSIT INSURANCE CORPORATION (FDIC)

FDIC reported limited activities in both hearing conservation and noise abatement.

Hearing Conservation

The Federal Deposit Insurance Corporation does not have a formal hearing conservation program as noise exposure problems were reported to be almost nonexistent. The FDIC makes available annual hearing tests to employees.

Noise Abatement

The Federal Deposit Insurance Corporation reported no significant noise problems. Sound-proofing was installed in a few instances to reduce noise levels.

FEDERAL POWER COMMISSION (FPC)

This agency reported an involvement only in the area of hearing conservation.

Hearing Conservation

The Federal Power Commission reported that its employees are exposed to few, if any, potentially hazardous noise sources as its activities are administrative rather than industrial in nature. Commission facilities were inspected by Department of Labor staff on September 17-20, 1972 for compliance with the provisions of the Occupational Safety and Health Act and Executive Order 11612. No noise levels exceeding OSHA requirements were identified. The Commission has obtained a sound level meter and calibrator and now has the capability to conduct noise surveys to ensure safe working conditions for employees.

GENERAL SERVICES ADMINISTRATION (GSA)

GSA noise related activities may be categorized as standards and regulations and noise abatement.

Standards and Regulations

The General Services Administration has implemented noise control requirements for government construction sites and for procurements by the Federal Supply Service.

GSA procurement specifications which have been revised to include noise emission limitations cover the following items:

- Portable pneumatic drills
- Pneumatic grinder
- Pneumatic impact wrench
- 21-inch rotary gasoline-powered lawn mower
- 24-inch through 60-inch rotary gasoline engine powered lawn mowers
- Rotary wheel gasoline engine powered lawn mower.

GSA has specified that equipment employed at government-building construction sites shall not be permitted to exceed the limits in dBA shown in Table C-7 at a distance of 50 feet from the equipment under test. As indicated in Table C-7, the limits, which have been

TABLE C-7

GSA CONSTRUCTION EQUIPMENT NOISE EMISSION LIMITS

Equipment Types	*Noise Emission Limits (in dBA)*	
	Effective July 1, 1972	*Effective July 1, 1975**
Earthmoving		
front loader	79	75
backhoes	85	75
dozers	80	75
tractors	80	75
scrapers	88	80
graders	85	75
truck	91	75
paver	89	80
Materials Handling		
concrete mixer	85	75
concrete pump	82	75
crane	83	75
derrick	88	75
Stationary		
pumps	76	75
generators	78	75
compressors	81	75
Impact		
pile drivers	101	95
jack hammers	88	75
rock drills	98	80
pneumatic tools	86	80
Other		
saws	78	75
vibrator	76	75

*Extended from January 1, 1975, by internal GSA notice.

in effect since July 1, 1972, have been extended until July 1, 1975. GSA is considering a wide range of alternatives for revising the regulation. The advantages of a property line regulation are being re-examined as well as those of an individual equipment regulation.

EPA has informed GSA that many of the equipment limits initially scheduled to become effective January 1, 1975 were in EPA's opinion too stringent. EPA continues to meet with GSA to provide assistance in the development of a revised regulation.

Noise Abatement

The primary General Services Administration effort toward the establishment of limitations on noise emission has been by the inclusion of appropriate controls or limits in the specifications and regulations for which it is responsible. Specifically, the Public Buildings Service of GSA has taken steps to reduce noise levels in the following areas.

Construction Equipment Sound Levels

GSA has established maximum permissable sound levels for construction equipment. The sound levels are published in the Special Conditions section of GSA specifications and are described above.

Enforcement of Construction Equipment Sound Level Standards

All Regional Administrators were advised to purchase portable sound level meters and to monitor construction sites on both a scheduled and an ad hoc basis.

Operating Mechanical Equipment Sound and Vibration

Limitations on sound and vibration of building systems equipment have been issued in the Vibration Isolation section of GSA specifications. Enforcement of this criteria is within the precinct of the Contracting Officer, and material not complying is to be rejected.

Acoustical Privacy in Open Office Space

GSA has issued requirements in the Integrated Ceiling and Background section of the specification for sound attenuation and generation in order to provide speech privacy.

GSA did not provide information concerning the other subordinate activities under its jurisdiction. The GSA does not have personnel assigned exclusively to noise programs, and no estimates were made as to the number of individuals or the percentage of their time spent on noise activities. Information was not provided regarding costs or budgeting.

GOVERNMENT PRINTING OFFICE (GPO)

The only reported activities agency were in the area of hearing conservation.

Hearing Conservation

The overall objective of the GPO hearing conservation program is to assure that noise levels are kept within those set by OSHA. However, much of the industrial equipment presently in use by the GPO was procured before noise control was made part of the purchase consideration. Therefore, some equipment presently in use exceeds currently acceptable noise levels. The GPO is using available engineering discipline and technologies to reduce these to acceptable standards wherever feasible, supplemented by use of hearing protectors. The effectiveness of the GPO hearing conservation program is limited by the lack of availability of printing plant machinery manufactured in the U. S. that utilizes the latest state of the art noise suppression equipment.

GPO Instruction 670.5, Hearing Protection Program, dated December 31, 1971, delineates the responsibilities and duties of the Safety Officer, Director of Engineering Services, Medical Officer, Supervisors, and all GPO employees in carrying out the hearing conservation program. The program encompasses:

- Periodic surveys to identify areas of excessive noise.
- Identification of excessive noise areas with obvious markings.
- Use of engineering practices to reduce sound levels below authorized limits.
- Audiometric tests.
- Provision of hearing protectors and instructing employees in their proper use.

The Agency has had only one claim for noise induced hearing loss. At present, a determination of the validity of this claim has not been made. Funding for the hearing conservation program is not separately identifiable.

LIBRARY OF CONGRESS

This agency reported limited involvement in the area of hearing conservation.

Hearing Conservation

The Library of Congress reported that its operations do not produce excessive noise exposure, and a formal hearing conservation program is not conducted. However, the Library of Congress is considering the establishment of a hearing conservation program to improve employee morale and efficiency.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

This agency conducts extensive activities in both hearing conservation and noise abatement.

Hearing Conservation

All NASA Centers have hearing conservation programs. The programs vary somewhat among the Centers but do include the general features: noise measurement, evaluation of exposure, recommendation of controls (engineering, personal protective, administrative), and audiometric examinations. OSHA standards are followed, with the exception of a more stringent 85 dBA standard at the Jet Propulsion Laboratory. General environmental health policy guidance is provided in a policy directive, and specific guidelines for the conduct of hearing conservation programs is contained in a handbook ("A Guide to Hearing Conservation in Noise Exposure"). These instructions are supplemented by applicable directives at each Center.

The overall goal of hearing conservation programs in NASA is to protect the hearing of employees. To ensure that exposures do not exceed the OSHA standard, considerable attention is given to the identification of potential noise exposure areas. Such areas are identified by walkthrough surveys; investigation of complaints; involvement in planning; and review of purchase requests, contracts, engineering drawings, and health and safety plans of contractors.

When potential noise exposure operations or areas are identified, noise intensities are determined by the use of sound level meters and/or octave band analyzers. In some cases, noise dosimeters are also utilized. Duration of exposure is compared with noise intensities measured to determine where over-exposures exist. When over-exposures or exposures approaching the OSHA standard are found, engineering controls are recommended to contain or otherwise control the noise at its source of generation. When this is not possible, administrative control and ear protective devices are utilized.

Audiometric examinations are given to all persons significantly exposed to noise and, at most installations, they are also given routinely to all employees covered in periodic physical examination programs.

Various types of ear protective devices are provided for use by personnel occupationally exposed to noise. These devices are fitted as necessary, and the wearer is instructed in their proper use. More inclusive training is also given on the broad subject of noise hazards and control.

Noise emanates from various types of operations and equipment at NASA installations. Some of the more common noise sources are listed below.

Wind Tunnels
Aircraft
Aircraft/Rocket Engine Testing
Noise and Vibration Tests
Electric Power Generation
Compressors and Vacuum Pumps
Environmental Chambers
Construction Activities
Computer Equipment
Noise Research Activities
High Pressure Gas Venting
Traffic
Office Machines
Ventilation Equipment
Launch Activities
Plasma Arcs
Fabrication Activities
Machine Shops
Hydraulic Gear
Ultrasonic Cleaning
Testing of Relief Valves and Disks
Heating and Refrigeration Equipment

In response to an EPA request for data on the incidence of hearing loss, NASA reported that there have been 12 hearing disability claims made in the past ten years, most of which were made in the past two years. Analysis of 105 records at one center (Ames Research Center) produced the following results:

- 41% had little or no loss (less than a 25 dB loss at any frequency)
- 43% had slight loss (more than 25 dB at 3000 Hz or above)
- 16% had substantial hearing loss

It was noted by NASA that the average age of NASA employees is around 45, and that the above statistics include the effects of presbycusis. It is significant that such data are being collected and analyzed as part of the hearing conservation program at Ames.

NASA reported on a number of noise surveys and other projects aimed at reducing noise in the workplace. These include:

- A noise survey at the Goddard Space Flight Center. Ambient measurements were taken at various locations over a four-month period. Maximum values of 110 dBA were recorded at one location. Data were also taken from personal audiodosimeters carried by personnel in several exposure categories. Recommendations included: strict enforcement of the requirement for wearing hearing protectors in specified work areas; rotation of workers; isolation of certain major equipments and the use of remote controls; the procurement of additional hearing protectors and increased training in their proper use; a recommended program for maintenance and sanitization of hearing protectors.
- Two surveys at the Flight Research Center (FRC). One survey was conducted in the main office building. Office spaces having annoying levels of noise were identified, and recommendations were made to utilize noise attenuating materials such as carpeting in these areas. It also was recommended that a noisy machine be quieted via a suitable enclosure. The second survey at FRC was conducted in the industrial, shop, and laboratory areas. No areas were identified which would violate OSHA

standards. It was noted, however, that the primary source of noise – aircraft noise – was not present on the days when the survey was made. The machine shop was found having sound levels marginally lower than the allowable maximum. Use of heavy protection was recommended in this area.

- A survey of computer room noise at Wallops Island. One area was identified in excess of 90 dB. Recommendation was made to ensure that workers are stationed in quieter locations (when a choice was possible), and otherwise hearing protectors should be worn or the exposure time administratively reduced.
- A survey of radar data acquisition facility at Wallops Island. One location was identified at 102 dBA. Recommended use of warning signs and ear defenders.
- Several studies at Kennedy Space Center, including (1) the evaluation of improved mufflers for mowers, (2) evaluation of noise from construction equipment (caterpillars, etc.) at the Space Shuttle launch site, and (3) a survey of certain office equipment (typewriter/printers). More effective mufflers and/or relocation of the mufflers were recommended for the caterpillars, along with installation of a partial cab for the operator, and ear protectors. Available mufflers for mowers were found to be inadequate, and exposure limits for unprotected personnel were set in accordance with OSHA standards. The survey of office equipment found that the associated noise levels did not constitute hazards to hearing but that they were unacceptable for office environments. Recommendations included (1) the installation of a noise attenuating cover on the typewriter Printer; (2) the installation of sound absorbent matting under each unit; and (3) installation of sound absorbent panels between the units and the surrounding office area.

Noise Abatement

NASA has internally established general policy regarding environmental quality and control (NASA Policy Directive 8800.6B). Pursuant to this general policy, NASA is presently evolving procedures and standards to consolidate practices at NASA installations with respect to the prevention, control, and abatement of noise.

NASA noise abatement projects can be considered in two categories. The first is those activities which involve the construction, rehabilitation, or modification of major facilities in such a way that the noise imposed upon the surrounding community ("over-the-fence") is reduced or eliminated. There are no projects of this nature presently funded nor are any planned for the immediate future. The only such project funded in prior years was for the construction of a sound-absorbing structure around a wind tunnel at the Ames Research Center. This project was funded in FY73 at a cost of $495,000.

The second category of noise abatement projects is that consisting of supporting studies and analyses related to the noise imposed upon the surrounding communities by rocket test facilities and launch sites. Although some of the work reported in this category could be considered as research it has been included as noise abatement because its intent is to reduce the noise impact of ongoing and planned NASA activities. All of the projects, summarized below, are being conducted at the Marshall Space Flight Center and are in connection with the large launch vehicle programs of NASA. Funding for these projects is as follows: FY72 - $50,000; FY73 - $75,000; FY74 - $470,000; FY75 - $455,000.

Industrial Noise Generation and Control

Various projects, internal to MSFC, are done as required in connection with new test and developmental facilities, for the prevention of undesirable noise levels at work stations adjacent to these facilities. Early prediction of the noise environments is desirable in order to alter facility or operational design if required. Model tests or other methods usually aid in definition of the environments and to suggest ways to reduce the noise from system operation. Recommendations usually take the form of sound source modifications or the use of suitable attenuation schemes.

Acoustic Environmental Assessments and Environmental Statements Concerning Community Noise Exposure

These projects are done in-house as part of the planning for launch sites and for static rocket tests. Their purpose is to ensure that the acoustic environment during operations minimizes community impact. Acoustic environmental assessments require accounting for numerous factors, including: the sound source, acoustic power, spectral characteristics of the sound, directivity patterns, atmospheric and ground cover absorption, propagation effects in alleviating focusing of the acoustic energy, exhaust deflector type and cooling methods, community locations, population densities, and socio-economic factors.

Planning for Test Operations Which Generate Noise

These are in-house efforts and are also part of the planning efforts for large rocket engine tests. Included are: engine test site evaluations, test stand selections based on directional orientation, and advisory test scheduling using meteorological control in reducing farfield environments. Community response is periodically surveyed in connection with test firings in order to evaluate the community impact of test operations.

Sonic Boom Environmental Assessments and Shuttle Launch Azimuth Constraints

Definition of the sonic boom overpressure level characteristics developed during Shuttle launch is essential in order to establish an accurate description of the environmental assessment and subsequent community response. During ascent of the Space Shuttle, a sonic boom focal zone region is developed at the ocean surface. This focal region, which contains very high localized overpressure levels extends to approximately 45 nautical miles on both sides of the ground track. These regions must be identified and measures must be taken to ensure that the outer edges of these focal zones do not occur on the highly populated land mass surrounding the Shuttle launch sites. Consequently, launch azimuth constraints have to be imposed for all Shuttle flights. Efforts are currently in progress, both in-house and contractually, to provide for this environmental definition.

Space Shuttle Hot Model Tests

A 6.4% model of the Space Shuttle Vehicle and launch facility have been built and are now being tested at the Acoustic Model Test Facility (AMTF) at MSFC. The basic objectives are to provide a dynamically scaled flow model, in which case the environments on the model are equal in amplitude to the full-scale environments with only a spectral shift in the noise spectra. A minimum of data scaling is required and accuracy in defining the environments for the full-scale vehicle and surrounding areas is more nearly guaranteed in a dynamically scaled test. Such tests involve use of combustible solid propellant and liquid propellant model engines, with exact flow conditions specified, and scaled launch facilities to determine the interface effects. The exhaust trenches and deflectors are also scaled as is the mobile launcher (ML) structure, which carries the prototype vehicle from the assembly area to the launch pad at KSC. The exhaust impingement on the ML is influential in generating the noise environments and will be evaluated and studies as a factor in launch simulations involving 24 firings from elevations up to almost 300 feet full scale. Some 60 acoustic measurements will be made on each test to aid the definition of the vehicle environment and crew exposure along with the farfield acoustic conditions induced in surrounding areas.

This data will be used to update, if necessary, the EIS for both the Eastern Test Range and Western Test Range on-pad and launch case.

The latter portion of this program will utilize two sound suppression techniques that are to be selected with the aid of the results from the cold flow model test efforts. The objective is to verify, with the hot flow model, the sound suppression effects that are noted from methods from the more economical cold flow tests. Some seven hot test firings will be made with a scaled launch facility in order to determine the reductions in acoustic environments for the vehicle and surrounding areas, including community areas adjacent to ETR and WTR launch sites. The project is being conducted in-house and has been funded for $350,000 in FY74 and $355,000 in FY75.

Space Shuttle Noise Suppression

The objective of this project is to perform an analytical and experimental study of possible noise suppression techniques for the Space Shuttle propulsion system. The Space Shuttle propulsion system presents a unique problem in terms of launch facility design requirements. The two separate exhaust ducting arrangements are of special concern to launch facility design personnel and are important in determining the farfield conditions. The two solid motor exhausts flow in one direction with the orbiter's exhaust in an opposite direction, i.e., 180° from the other. Of particular concern is the assurance that modifications of the existing launch complex 39 facility can be made so that the exhaust products can be adequately discharged from the launch facility. It is mandatory that each exhaust trench or duct be designed so that it does not restrict the exhaust flow which will in turn result in pressure buildings within the duct and at the base of the Space Shuttle and induce degradation in the performance of the Space Shuttle system. Adequate design of the exhaust deflector trench or duct system can only be accomplished by testing. Several liftoff positions (elevations to approximately one vehicle length) will be utilized to determine the acoustic environment changes due to exhaust impingement effects on the ML. Acoustic data from the vehicle areas are also obtained. Direct verification of these results will be acquired using the hot flow SSV model.

Funding for this project contracted to Chrysler Corporation, was $75,000 in FY73 and $70,000 in FY74.

NATIONAL LABOR RELATIONS BOARD (NLRB)

This agency reported involvement in the area of hearing conservation.

Hearing Conservation

Although the NLRB has only recently identified a noise exposure problem produced by its operations, the agency is planning to develop a hearing conservation program designed to curtail similar problems and to control noise on a systematic basis. A noise survey of a headquarters printing facility indicated noise levels only slightly below the OSHA 90 dBA limit. Subsequent audiometric testing of 16 employees indicated that one had a 23 percent hearing loss (primarily due to previous medical problems), four employees had either one or two percent hearing loss, and the remaining employee's tests were negative. The NLRB consequently issued all Print Shop employees with personal protective devices. Periodic audiometric testing will be performed on all Print Shop employees, and baseline audiograms taken on all new employees.

NATIONAL SCIENCE FOUNDATION (NSF)

NSF reported limited involvement in hearing conservation.

Hearing Conservation

The National Science Foundation reported that its operations include no activities that create noise levels sufficient to constitute a health hazard, and, therefore, no formal hearing conservation program has been established.

As part of an overall preventive medicine program, the Agency's Health Service conducts periodic employee health maintenance examinations which, since 1969, have included an audiometric examination. Significant hearing deficiencies are reported to the employee and recommendations made for further evaluation and treatment as indicated. In all instances, hearing losses found during the examination antedate the employee's entrance on duty with the Agency.

SECURITIES AND EXCHANGE COMMISSION (SEC)

SEC activities relate to the area of hearing conservation.

Hearing Conservation

The Securities and Exchange Commission does not have a formal hearing conservation program. The Commission identified no significant noise exposure problems, although expressing interest in a noise survey of its print shop and computer facilities.

Periodically, the Health Unit conducts a hearing loss detection program. No work-related hearing loss has been reported.

SELECTIVE SERVICE SYSTEM

Reported activities fall into the noise abatement category.

Noise Abatement

The Selective Service System reported no significant noise problems. However, sound conditioning is an integral part of all alteration and renovation planning within the Selective Service System. Standard acoustic conditioning includes full carpeting of work areas where possible, sound insulating and absorption draperies on windows where required, acoustic covers for teletypewriters and automatic typewriters, and acoustic wall treatments for high noise areas. In FY73, GSA conducted a noise survey of a Selective Service System computer center and recommended installation of sound absorptive materials at an estimated cost of $21,500. Separate accounts for noise abatement activities are not maintained as comparatively little work is undertaken in this area.

SMALL BUSINESS ADMINISTRATION (SBA)

SBA reported involvement in the area of standards and regulations.

Standards and Regulations

The economic effects of complying with standards for the abatement and control of noise were recognized early. The potentially heavy economic burden, particularly on small businesses, received particular attention. Thus, Section 28 of the aforementioned OSHA Act amended Section 7(b) of the Small Business Act (15 U.S.C. 636) to permit assistance to any small business in altering equipment, facilities, or methods of operation so as to comply with OSHA standards. And on January 2, 1972, P.L. 93-237 (the Bible Amendment) further broadened, by Section 2(a), the provisions of Section 7 of the Small Business Act to permit financial assistance within the established loan limits to small firms seeking to comply with any Federal law, any State law enacted in conformity therewith, or any regulation or order of a duly authorized, Federal, state, regional or local agency issued in conformity with such Federal law if the Administrator (of the SBA) determines that "such course is likely to suffer substantial economic injury without assistance under this paragraph".

TENNESSEE VALLEY AUTHORITY (TVA)

TVA conducts extensive activities in both the hearing conservation and noise abatement categories.

Hearing Conservation

A hearing conservation program was initiated in the Tennessee Valley Authority in March 1955. The TVA program has as its goal the prevention of occupation-related hearing loss among its 20,000 to 25,000 employees, many of whom work in industrial environments where a real potential exists for excessive noise exposure.

The Agency program consists of four major efforts: environmental planning and hazard control guidance, medical surveillance, production level implementation and enforcement, and incorporation of noise control principles in the design and planning of new plants. These four functional areas are directed respectively by the Division of Environmental Planning, the Division of Medical Services, operating divisions within TVA, and the Division of Engineering Design. The program encompasses preemployment and periodic audiometric testing and related physical examination of all employees, surveillance of noise levels in operating environments, the provision by TVA of personal hearing protectors to employees, and implementation of engineering and administrative noise controls. Approximately 14,000 employee audiograms and about 80 sound level surveys plus numerous special investigations are performed annually.

The ongoing hearing conservation program has been incorporated as one element in the TVA comprehensive hazard control plan, the implementing strategy for which was published on January 16, 1974. The plan is designed to ensure that occupational safety and health becomes an integral part of all operating activities. TVA hazard control efforts are to be consistent with Federal occupational and health standards, and where no such standards are available, TVA will develop its own. TVA requires that contractors who perform services for TVA comply with applicable TVA and Federal hazard control standards and present a related plan of action satisfactory to TVA.

Under the plan standards and criteria will be developed to reduce noise exposure by engineering, administrative, and personal protective means. Design criteria for noise control and noise emission specifications for new equipment will become a part of this plan when developed. Currently, an effort is in progress to establish reasonable noise emission specifications for heavy construction equipment.

Operating divisions within TVA may issue specific instructions on hazard control under the plan. The Division of Power Production has implemented an instruction on hearing conservation which is applicable to electric generating plants and which supplements the general TVA standard on hearing protection. This instruction establishes a comprehensive hearing conservation program which includes indentification and marking of high-noise level areas (defined as work environments containing 90 dBA or more of continuous noise), periodic noise surveys, audiometric examinations and safety briefings to employees, and mandatory use in high-noise level areas of approved hearing protectors enforced by disciplinary action.

TVA activities include the operation of thermal electric generating plants, dams and hydroelectric plants, a fertilizer plant, laboratories, and construction projects. Surveys have been conducted to identify potentially harmful noise levels in these activities, and four reports on in-depth noise surveys were submitted by the TVA. Of particular concern are the thermal electric generating plants which, due to the nature of current technology, are quite noisy. All personnel are provided effective personal hearing protectors which they are required to wear in marked areas where operational noise normally exceeds 90 dBA. In addition, acoustical booths have been installed in four plants.

Workers with fixed work locations, e.g., control room operators, shop workers, and administrative personnel, are provided environments which normally meet permissable exposure limits. Most plant workers, however, do not have fixed work stations and move through various areas of the plant with varying operational noise levels. TVA has attempted to estimate noise exposures based on area noise surveys and estimates of the workers stay-times in different areas. Results indicate that of 3020 workers in 10 steam-electric generating plants, 989 had an 8-hour exposure greater than 85 dBA and 286 greater than 90 dBA. All of the workers with exposures over 90 dBA were employed as auxiliary operators and trainees, boilermakers, welders and blacksmiths, conveyer-car dumper operators or heavy equipment operators.

TVA converts hearing loss measured in dB to percent binaural hearing impairment using American Medical Association criteria. The value is recorded in the employee's medical record and, since 1967, on computer tape. Beginning July 1, 1974, in addition to percent binaural hearing impairment, actual dB loss measured in each ear at 500,1000,2000,3000, 4000, and 6,000 Hz are recorded. TVA submitted the following data on impairment among Division of Power Production personnel.

Employees with Binaural Hearing Impairment (ALL CAUSES)

	*Percent Binaural Impairment**		
Location	*0.1 - 9.9*	*10.0 - 24.9*	*25.0 - 99.9*
Steam Plants (9)			
Number (%) of employees	478 (14)	96 (3)	45 (1)
Hydro Plants (19)			
Number (%) of employees	37 (12)	7 (2)	2 (1)

Steam plant data as of June 1973 on approximately 3,505 employees.

Hydro plant data as of June 1974 on approximately 300 employees.

*AMA/AAOO 1958 criteria

Exact information is not available on the number of hearing disability claims, although a rough estimate is from 1 to 2 per year.

The greatest barrier to program effectiveness is limited feasible noise control technology. Low noise-emission equipment is too often not available or available only at unreasonable costs. The availability of trained personnel, particularily in the areas of analysis and control, and limited funding have also hampered hearing conservation efforts.

TVA has recently established a multidisciplinary, interdivisional noise control engineer-team consisting of a noise specialist, operations engineer, and a design engineer supplemented by professional assistance from an industrial hygienist. This team's approach is to identify the specific process systems most responsible for excessive employee noise exposure, determine the noise generating mechanisms, test and select possible control techniques, implement successful and feasible control techniques in other operating systems, and incorporate successful and feasible techniques in the design of new systems and plants.

Although the hearing conservation program utilizes medical, environmental, design, and operations personnel, no estimates were reported on the numbers of individuals or percentages of their time spent on hearing conservation. Specific budgetary information was not provided due to TVA accounting procedures.

Noise Abatement

The TVA objective in community noise control is to prevent the generation of noise from TVA facilities which will produce unacceptable noise levels in nearby community environments. There have been few complaints from the public about excessive noise from TVA facilities. This is probably the result of the remote location of most plants from population centers and the generous buffer areas between plant and boundaries. Some complaints have been registered over the years and include noise from blasting, coal car shake-outs, pressure relief valves, and pumps. Every complaint is promptly investigated and corrective measures taken. TVA has identified potential over-the-fence noise problems related to the operation of electric generating plants and power transmission systems, the use of heavy construction equipment, blasting, and miscellaneous sources such as trucks, aircraft, trains, and boats.

For new facilities, the Division of Engineering Design incorporates noise control engineering in the design of new plants. Noise specifications are used where feasible in preparation of purchase specifications for new equipment. Evaluation of noise impact is included in environmental statements prepared on TVA projects, and noise surveys conducted at major construction sites for EIS purposes. Gas turbine facility sites have been surveyed before and after installation of the turbines.

Future TVA noise abatement plans, although not yet approved or funded, call for programs including the following elements:

- Identification and classification of potential community noise sources throughout TVA
- Evaluation of community impacts from existing facilities
- Establishment of noise models for various types of operations
- Evaluation, selection, and implementation of control measures including use of noise criteria in equipment purchase, engineering design and engineering modification to existing.

No information was submitted on personnel involved in noise abatement activities. Approximate expenditures for noise abatement surveillance, special studies, complaint investigation, environmental monitoring, and design work were FY72 - $10,500, FY73 - $24,500, FY74 - $38,400 and estimated FY75 - $50,000.

UNITED STATES POSTAL SERVICE

The Postal Service reported activities in both hearing conservation and noise abatement.

Hearing Conservation

Although the Postal Service reported that generally it does not have a noise exposure problem, guidelines and procedures have been established for a service-wide hearing conservation program to comply with the requirements of the Occupational Safety and Health Act of 1970. To ensure compliance, safety personnel take noise measurements during their routine inspection of all Postal installations. The Postal Service reported that, to their knowledge, all installations are in compliance with OSHA's occupational noise exposure standard.

The Postal Service's *Supervisor's Safety Handbook* establishes procedures for requesting noise measurements in potential problem areas, provides for noise engineering control measures, and stipulates that personal ear protection devices be made available to employees exposed to sound levels exceeding 85 dBA and be mandatory when levels exceed 90 dBA. The Employee Relations Department has also provided guidance to regional offices on audiometric technician training and audiometric equipment.

In some of the Postal Service's large, highly mechanized installations, limited audiometric testing programs have been recently initiated. For example, the Bulk Mail Centers are required to have audiometric testing equipment and to conduct employee tests at the time of employment and annually thereafter.

The Office of Workers' Compensation recently adjudicated two hearing loss cases in favor of Postal Service employees. In neither of these cases were the employees exposed to noise levels exceeding 90 dBA. In one case, 83 dBA was the maximum level of exposure for the employee.

The overall noise exposure objective of the Postal Service is to provide a work environment that does not exceed 85 dBA. Steps taken to achieve this objective are discussed below under noise abatement. Information on hearing conservation funding was not submitted.

Noise Abatement

The Buildings Analysis and Design Office is responsible for coordinating the efforts of numerous Postal Service organization elements that include noise abatement as one of their major concerns. The overall program objective is to maintain the lowest noise levels feasible. The Postal Service is attempting to define an optimum noise level that balances the cost of noise suppression against employee environment. At the present time, it appears that 80 dBA at operators' positions is a feasible goal. The program encompasses reduction of noise emissions from both existing and new equipment.

The Postal Service reports that currently installed equipment and operating procedures meet OSHA requirements. Surveys to establish existing noise levels in postal facilities throughout the nation together with initial noise standards and measurement techniques were provided through the Postal Service Research Department. The Postal Service "Working Conditions Improvement Program", which establishes guidelines for upgrading environmental working conditions, deals with occupational noise exposure. Noise abatement is to be provided so that employee exposure for an 8-hour period does not exceed 85 dBA; maximum levels for specified areas are stipulated ranging from 50 dBA for window service areas to 78 dBA measured at 10 feet from the nearest equipment for workroom areas.

The Postal Service has a contracted project entitled "Sound and Vibration Control in Post Office Facilities" which involves the development of systems and equipment modification to reduce noise levels. This effort applies to existing equipment only. Recommended solutions will be tested to assure efficacy and acceptability for nationwide application. Followon programs to retrofit postal equipment will depend largely on the cost-benefits of the retrofits developed.

The program for new equipment consists of including a noise limit in contract specifications. Many contract specifications now stipulate 80 dBA as the maximum acceptable level. Upon procurement, equipment is joined with other equipment to form mail handling systems tailored to the requirements of individual post offices. The additive noise effect of equipment joined in systems has not been a problem because of ample spacing between system components.

The Postal Service indicated that its facilities did not generate any significant over-the-fence noise. The only sources that might be identifiable at the property lines are electric power transformation and distribution stations, postal vehicles, and direct expansion centrifugal compressors used in facility air conditioning systems.

The Postal Service has ten professional engineers engaged in noise related efforts. They are supported by 487 safety specialists who are trained in the basic problems of noise abatement and sound measurement techniques.

The contract effort to develop noise control techniques for existing postal equipment totals $210 thousand over several years. The approximate cost of in-house personnel involved in noise abatement for FY74 is $100,000. In addition, travel expenses and instrumentation prorated against noise control is $50,000 per year. Future contracts to assist in establishing noise criteria and correcting noisy installations are estimated at $50,000 per year.

VETERANS ADMINISTRATION (VA)

Reported VA activities include standards and regulations, hearing conservation, and noise abatement programs.

Standards and Regulations

In the past, the FHA and its successor, HUD, have usually collaborated closely with the VA in applying planning and rating criteria for subdivision developments and individual dwelling design. However, the VA has restricted its advice to buyers of existing (VA-financed) housing to information normally not readily available to individual buyers. This has been interpreted by the VA to restrict their activities to compel disclosure of exposure of residential properties to noise from nearby airport operations. Section VIII of Manual M26-2 Change 43 (September 24, 1969) provides that "In the absence of mandatory planning and/or zoning for non-residential use, the VA must recognize the possible unsuitability for residential use and the probable adverse effect on livability and/or value of homes in the vicinity of major airports". Among the adverse effects the VA lists conditions generated by "existing or potential hazards of low-flying aircraft, the nuisance of turbulence, bright lights, dust, varying degrees of noise intensity and in the absence of zoning the possibility of the use of adjacent property for detrimental, non-residential purposes" (Section 2.47).

Instead of imposing "national predetermined formulas" for measuring depreciation allowances for properties near airports, VA directs each field office to "consider each case individually", taking into account the "effect of airport development upon the value of neighboring property" and "the reaction of the typical purchaser" (Section 2.48).

For residential development approvals of sites near airports with less than 100 daily takeoffs and landings and less than 80 runups, noise should not be a factor (the so-called Zone 1). Where airports with 100-115 takeoffs and landings and 80-95 runups are concerned

(Zone 2), counter-measures for noise such as acoustical treatment acceptable to the market (e.g., sound-proofing and year-round air-conditioning) may permit development of property acceptable for GI loans. Natural or artificial barriers may also be used to obtain the same effect. Where the number of takeoffs and landings exceeds 115 and the number of runups exceeds 95 (Zone 3) the locations normally are not acceptable for residential development in FAA practice. But, the VA instruction continues, "properties otherwise acceptable are not to be rejected because of airport influence if there is evidence of acceptance by a fully informed veteran." The VA position is, the instruction continues, "that since the dwellings are in use and are expected to continue so in the foreseeable future, their marketability should be the strongest indicator of their acceptability." (Section 2.50).

VA regional offices are instructed to maintain a separate file on each airport in their area, including maps showing Composite Noise Rating zones and any areas of objection applicable to the airport (Section 2.53).

On September 10, 1974, the VA Administrator issued DVB Circular 26-74 which directs compliance with NEPA requirements and contains specifications for EIS preparation, including the Subdivision Feasibility Report (ASP-3) for the A-95 Clearinghouse review (39 FR 33614-5, September 18, 1974).

EPA has requested that VA adopt the L_{eq}/L_{dn} descriptor.

Hearing Conservation

The Veterans Administration is implementing a hearing conservation program which encompasses audiometric testing and noise monitoring. VA has adopted a Safety, Occupation Health and Fire Protection Standard on Noise, dated January 18, 1974, which established permissable noise exposure levels more stringent than OSHA requirements. The standard requires use of feasible administrative or engineering controls, provision of hearing protective equipment, and institution of a continuing effective hearing conservation program in all cases where exposure exceeds 85 dBA for eight hours.

An audiological examination of boiler and utility plant operators (both preemployment and annual) has been in effect since March 30, 1973. VA headquarters has recently hired a senior industrial hygienist who will refine the audiological testing program in addition to performing other noise-related activities.

An on-going industrial hygiene monitoring program is VA policy and has been established at all VA facilities to detect and evaluate potential health hazards from harmful noise levels.

VA did not provide information on either personnel levels or funding for hearing conservation.

Noise Abatement

VA noise abatement activities include the consideration of noise in conjunction with equipment procurement and preparation of environmental impact statements.

VA plans to develop noise limiting procurement specifications for certain equipment used in VA facilities. Potential noise impact in the construction and operation of VA hospitals is considered in the preparation of environmental impact statements for new construction.

INTERNATIONAL ASPECTS OF NOISE-CONTROL RESEARCH AND REGULATORY DEVELOPMENT

The following is a brief summary of United States participation in recent activities of international organizations concerned with noise-control research and regulatory standards. The timing for this report did not permit the fuller treatment intended for future reports.

The abatement and control of noise and the conservation of hearing is a concern shared by all nations. For the highly industrialized nations, the wide use of machinery and powered transportation equipment has brought with it the generation of noise to levels often highly injurious to public health and welfare. With the increase of noise in the environment, inquiry and research have been pursued in many countries to develop ways to control noise and protect hearing. At the beginning of the comprehensive Federal noise-control program coordination now assigned to the Environmental Protection Agency, a survey was made of the status of noise control and noise abatement research in other countries.*

Since the efforts to control noise sought to advance and share the fruits of research, it was only natural that particularly the functional international organizations should address the problem. Further, in such areas as air transportation the advancement of technology exposed the inhabited areas of many nations to new types of noise hazards that could be controlled and lessened only by common agreement on equipment and operational standards.

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*Title IV report, Chapter 6 and the source document cited there.

The United States has been a leading participant in international functional organizations. The following resume of the noise control activities of several of these international organizations is not only important for the cooperation it reflects. This cooperation may also be important for the commonality in standards and practices it can provide so that environmental protection will achieve uniform levels and differences in standards will not engender controversy.

The International Civil Aviation Organization (ICAO)

The International Civil Aviation Organization (ICAO), created by the Chicago Convention of 1944 and with a current membership of 123 countries, began to address the problem of aircraft noise control in the 1960's.

ICAO developed aircraft noise standards pursuant to Convention Article 37 after formal considerations at the International Conference on the Reduction of Noise and Disturbance Caused by Aircraft (The "London Noise Conference") of November 1966, the Fifth Air Navigation Conference of ICAO in Montreal of November 1967, and the Special Meeting on Aircraft Noise in the Vicinity of Aerodromes held in Montreal in November and December 1969. The proposed standards were formally adopted by the ICAO Council on April 2, 1971, as Annex 16 on International Standards and Recommended Practices with Respect to Aircraft Noise to the ICAO Convention, and made applicable to member states on January 6, 1972.

The most recent (fourth) meeting of the ICAO Committee on Aircraft Noise (CAN IV) took place in Montreal, Canada, from January 27, 1975, through February 6, 1975. Positions taken by the United States member are coordinated through the Interagency Group for International Aviation (IGIA) and approved by the Department of State. CAN IV recommended that Annex 16 noise limits be lowered by 4dB during approach and takeoff and 6dB on the sideline measurement. A closer measurement point was also recommended to reduce further the maximum permissible noise. Other changes in flights test procedures, tradeoff provisions, and atmospheric-condition corrections made ICAO Annex 16 technical provisions essentially identical with the FAR-36 regulations of the United States (see DOT/FAA above). Acoustic change provisions would restrict the amount of growth in noise in derivative or stretched versions of aircraft. But the revised levels did not take full advantage of available technology to achieve lower levels and provided few incentives for continued development of future acoustic technology.

CAN IV recommended that retrofit of current aircraft that do not meet Annex 16 standards be accomplished at the earliest date. On supersonic aircraft, CAN IV relaxed the

CAN III determination that future SST's must meet the same noise levels as are in effect for supersonic aircraft at the time application is made for a type certificate. (EPA's recommendation to FAA for the NPRM on Aircraft Noise Requirements for Civil Supersonic Airplanes of February 28, 1975, is similar to the CAN III position.) For propeller-driven airplanes CAN IV would upgrade recommended practices to make Annex 16 essentially identical with FAR-36.

OECD Addresses Urban Traffic Noise Control

The Organization for Economic Co-operation and Development (OECD), created by the Paris Convention of December 14, 1960, has addressed the complexity of problems faced by modern society as a result of rapid economic growth, expanding population and accelerating urbanization. With noise identified as a major intrusion on urban life and a source of annoyance and discomfort to large numbers of city dwellers, the OECD Consultative Group on Transportation Research undertook studies to assess the scope and magnitude of the urban traffic noise problem, to review the state-of-the-art of the technology of noise abatement, and to recommend practical and realistic measures for the control and reduction of traffic noise levels. This work resulted in a report entitled *Urban Traffic Noise: Strategy for An Improved Environment*, which received the endorsement by the Committee for Research Co-operation (since replaced by The Environment Committee) and was approved for publication by the OECD Council on January 27, 1971.

EPA, along with HUD, has participated in the activities of the Urban Sector Group of the Environment Committee of OECD as they relate to international aspects of noise control. As a result of the 3-year analysis of noise as a problem affecting urban environments, OECD has approved the establishment of an ad-hoc group to carry forward work leading to recommendations on regulations for noise control from various emission sources, and for the establishment of international agreements, in conjunction with ICAO, relating to airport noise control. To a large degree, international interests and concerns parallel those underlying the Noise Control Act of 1972. It is anticipated that the OECD mechanism will afford a means for developing uniform and consistent international regulations and standards.

The Cooperative Environmental Program of the United States and the Council of the European Communities (CEC)

The CEC has established a Commission on Environmental Matters that included in its activities an exchange of information on various environmental topics with the United States and of concern both to this country and European nations. From September 30 through October 2, 1974, a meeting of United States and CEC member representatives was held in Ispra, Italy. At the Ispra meeting, the problems confronting all of the represented countries were found to be quite similar. Transportation noise sources of primary concern were identified as including aircraft, trucks, motorcycles, and buses. But while in the United States the truck has been identified as a major noise source, the bus seems to present the greater problem in European countries due to its greater proportionate use in European transportation systems.

The next technical environmental meeting of the United States and CEC representatives is to be held in April 1975 in Washington, D.C.

United Nations Economic Commission for Europe (ECE)

Noise abatement and control within the ECE framework are addressed by the Noise Task Force of the Senior Advisors to ECE Governments on Environmental Problems. The next Task Force meeting is scheduled for April 29, 1975. Establishment of a noise task force was originally proposed at the fourth session of the ECE Working Party on Air Pollution Problems, held in Geneva, January 7-11, 1974. The task force was subsequently approved to function under the Senior Advisors. The goals of the task force are:

- To identify major problem areas in the control of noise injurious to health and welfare.
- To identify research, development, and demonstration needs in these major problem areas.

A two-phase work program is being implemented by the Task Force. The first phase concentrates on the collection of information from participating countries on identification and quantification of the effects of noise (hearing loss) and methods and techniques for controlling major noise sources. The second phase consists of evaluation of the information received, identification of major areas for further research on noise control, and demonstration of control measures. Workshops, central data collection and organization, and seminars are included in this task force work program. The task force program is to be reviewed at a November 1975 meeting and the final report on both work phases is to be ready for distribution in September 1976.

Discrepancies Among National Noise Control Standards Have Potentially Serious Economic Consequences

The protection of the environment has by now become a major international cooperative effort extending to the control and elimination of all major pollutants. The control and abatement of noise has not only become a concern particularly in the major industrialized nations, but is being addressed in the various international organizations in which these nations participate. This cooperation is not only desirable for the exchange of technical knowledge and experience and to achieve concerted action, but it may also help in avoiding possible economic and political controversy.

It is one thing to develop and specify means of noise control and quite another to implement such findings in the form of national standards and regulations. Standards to control noise emissions affect the design and price of equipments and installations. When such equipments enter international trade, discrepancies in national regulations governing design and operation can present serious obstacles and disadvantages particularly when international standards have not been developed and adopted. Thus, it is conceivable that noise-emission control may become an issue in automotive imports into the United States at least as much as that previously created by the clean-air regulations. Conversely, advances in noise-control technology applications to printing presses produced in Japan and Germany (where strong industrial noise-control requirements are in force) may bring serious competitive pressure upon the procurement of such equipments for major United States installations. This may even apply to Federal installations where preferential treatment of American producers would normally obtain if such installations are under equal pressure to achieve early implementation of the OSHA standards for limitation of noise in the work place.

EPA is still in the process of developing with the Bureau of Customs the regulations to be applied to imports of commodities subject to noise control standards, to be promulgated by the Secretary of the Treasury in compliance with Article 9 of the Noise Control Act of 1972.

State Department Role in International Environmental Affairs

Although the technical preparation for, and expert (advisory) staffing of delegations to, international public conferences also in the noise field involves participation of many federal agencies, the leadership of such participation forms an integral part of the total continuous process of foreign policy formation and conduct. In environmental affairs in general and for the noise program in particular, this continuity is provided by the Bureau of Oceans and Environmental and Scientific Affairs of the Department of State.

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